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ABSTRACT

The Educational Testing Service (ETS) was contracted by the National Center for Education Statistics to investigate changes in tested achievement using cross-sectional comparisons between the 1972 National Longitudinal Study (NLS) seniors and the 1980 High School and Beyond (HSB) senior cohort. The ETS is also responsible for estimating the extent and correlates of cognitive growth that takes place between the sophomore and senior year in high school; this latter analysis involves testing the 1980 HSB sophomore cohort and following them in 1982 with the same test battery. To discharge these responsibilities, an extensive psychometric analysis, reported here, was undertaken. The analysis was designed to: (1) estimate possible effects of differing administrative procedures from one cohort to another on tested performance; (2) evaluate whether the tests were measuring the same things across cohorts or within different administrations within the same cohort; (3) estimate item statistics, reliabilities, and indices of precision of measurement for separate tests and determine whether these measures are invariant across sex and ethnic group; and (4) develop and apply latent trait theory procedures where appropriate. There is little empirical evidence for the notion that the tests or test parcels measure different things for different ethnic or sex groups. The biggest gains over the 2-year schooling period were in vocabulary and reading. White students showed greater gains that did either of the other ethnic groups. There was a consistent tendency for Hispanic women to show greater gains than Hispanic men, and for the test score variance to increase from the sophomore to senior year. Student test booklet samples, 25 data tables, and 22 figures are included. (TJH)

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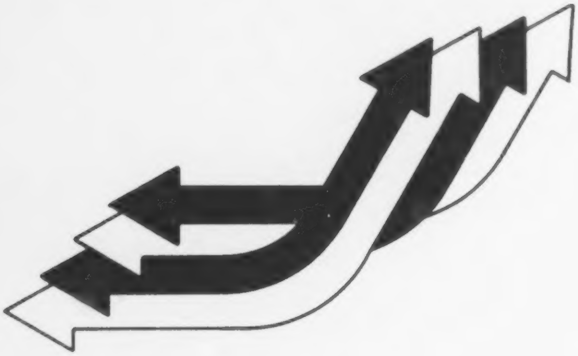
Psychometric Analysis of the NLS and the High School and Beyond Test Batteries

A Study of Excellence in High School Education: Educational Policies, School Quality, and Student Outcomes



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Psychometric Analysis of the NLS and the High School and Beyond Test Batteries

A Study of Excellence in High School Education: Educational Policies, School Quality, and Student Outcomes

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TABLE OF CONTENTS

Page

Executive Summary xi

Psychometric Analysis of NLS and HS&B Cognitive Tests 1

Brief Description of the Four Batteries and Their Interrelationships 1

- 1972 Tests 1
- 1980 Senior Tests 4
- 1980 Sophomore Tests 7
- 1982 Senior Tests. 8
- Common Items 8

Differences in Administration and Format. 11

- 1972 Administration. 11
- 1980 Administration. 12
- Other Administrative Differences 12
- Summary. 18

History of Tests. 20

- 1980 Tests 26
- Examination of Field Administrators Reports. . . . 29
- Editing of the Test Data 31
- 1980 Sophomore and 1982 Senior Data. 40
- Summary. 40

Item Analysis of the NLS and HS&B Tests 42

- The 1972 NLS Test Battery Item Statistics. 42
- The 1980 Senior HS&B Battery Item Statistics . . . 44
- Item Statistics for the 1980 Sophomore and 1982 Senior Cohort. 45

Reliability of the NLS and HS&B Tests 47

- Reliabilities of the Subtests. 50

Factor Structure of the Tests 59

TABLE OF CONTENTS
(Continued)

Page

Comparison of Factor Patterns for Sophomore and Senior Cohorts 67

Scoring and Equating Using Item Response Theory (IRT). . 80

- Cross-sectional Comparison of Test Score Change . 84

- Longitudinal Changes in Test Scores 98

Initial Comparisons of IRT Scale Scores with Observed Formula Scores 112

Summary. 116

References 120

Appendix A-Test Booklets 125

Appendix B-NLS Item Analysis Tables. 140

Appendix C-HS&B 1980 Senior Item Analysis Tables 154

Appendix D-HS&B 1980 Sophomore Item Analysis Tables. . . 167

Appendix E-HS&B 1982 Senior Item Analysis Tables 186

Appendix F-IRT Item Parameters 205

LISTING OF TABLES AND FIGURES

		Page
Table 1	Common Items in Senior Test Battery . .	9
Table 2	Administration Favored by Differences in Administration	19
Table 3	Summary of Unusual Circumstances Reported	30
Table 4	Mean Scores and Correlations Between First and Second-halves of Test Items for 1972 and 1980 Seniors	36
Table 5	Means and Correlations Between First Half of Items and Number of Attempted in Second Half	37
Table 6	Reliability of Total Test Scores (Formula Scoring)	49
Table 7	NLS 1972 Reliability of Subscores (Rights-Only Scoring)	53
Table 8	HS&B 1980 Seniors Reliability of Subscores (Rights-Only Scoring) . . .	54
Table 9	HS&B 1980 Sophomores Reliability of Subscores (Rights-Only Scoring) . . .	57
Table 10	HS&B 1982 Seniors Reliability of Subscores (Rights-Only Scoring) . . .	58
Table 11	Percent of Variance Explained by Selected Factor Analysis Solutions. .	61
Table 12	Two Factor Total Sample Cross-Sectional Solution for 1972 and 1980 Seniors.	63
Table 13	Two Factor Maximum Likelihood Solution for HS&B Sophomores and Seniors	68
Table 14	Two Factor Maximum Likelihood Solution for HS&B Male and Female Sophomores	71
Table 15	Comparison of a Two-Factor Solution for Male and Female 1982 Seniors. . .	72
Table 16	White(Black) Comparison of a Two-Factor Solution for 1980 Sophomores	73
Table 17	White(Hispanic) Comparison of a Two-Factor Solution for 1980 Sophomores.	74

Page

Table 18 Comparison of a Two-Factor Solution for White and Black 1982 Seniors 76

Table 19 Comparison of a Two-Factor Solution for White and Hispanic 1982 Seniors. 77

Table 20 Number of Cases Used to Calculate IRT Score Statistics on Sophomore Cohort Tests. 105

Table 21 IRT Score Statistics on Sophomore Cohort Tests-Vocabulary 106

Table 22 IRT Score Statistics on Sophomore Cohort Tests-Reading 108

Table 23 IRT Score Statistics on Sophomore Cohort Tests-Mathematics. 109

Table 24 IRT Score Statistics on Sophomore Cohort Tests-Science. 110

Table 25 Correlations of Test Score Gains with Initial Status, SES, and Academic Curriculum 115

Page

Figure 1 NLS and HS&B Tests 3

Figure 2 NLS of the High School Class of 1972 . . 14

Figure 3 Bivariate Distribution of School Means on First-half and Second-half of Vocabulary Test for 1980 Seniors. . . . 38

Figure 4 Bivariate Distribution of School Means on First-half and Second-half of Mosaic Comparisons Test, Part 2, for 1980 Seniors. 39

Figure 5 Vocabulary: Total Group 85

Figure 6 Vocabulary: Females 86

Figure 7 Vocabulary: Males 87

Figure 8 Vocabulary: Whites. 88

Figure 9 Vocabulary: Blacks. 89

Figure 10 Vocabulary: Hispanics 90

Figure 11 Reading: Total Group. 92

Figure 12 Reading: Females 93

Figure 13 Reading: Males 94

Figure 14 Reading: Whites 95

Figure 15 Reading: Blacks 96

Figure 16 Reading: Hispanics. 97

Figure 17 Mathematics: Total Group. 99

Figure 18 Mathematics: Females. 100

Figure 19 Mathematics: Males. 101

Figure 20 Mathematics: Whites 102

Figure 21 Mathematics: Blacks 103

Figure 22 Mathematics: Hispanics 104

EXECUTIVE SUMMARY

The Educational Testing Service (ETS) was contracted by NCES to investigate changes in tested achievement using cross-sectional comparisons between the 1972 National Longitudinal Study (NLS) seniors and the 1980 High School and Beyond (HS&B) senior cohort. In addition NCES has contracted ETS to estimate the extent and correlates of cognitive growth that takes place between the sophomore and senior year in high school. This latter analysis involves testing the 1980 HS&B sophomore cohort and following them up in 1982 with the same test battery.

Test scores are the critical indicators of change and growth in the above cross-sectional and longitudinal analysis. Because of the importance of the test batteries as indicators of change, an extensive psychometric analysis was undertaken to:

- Estimate possible effects of differing administrative procedures from one cohort to another on tested performance.

  Evaluate whether the tests were measuring the same things across cohorts or within different administrations within the same cohort. That is, is the underlying factor structure the same across administrations? Similar evaluations were done for sex and ethnic groups.
- Estimate item statistics, reliabilities, and indices of precision of measurement for the separate tests and determine whether these measures are invariant across sex and ethnic groups.

  Develop and apply Item Response Theory procedures where appropriate to put nonidentical but corresponding tests given to differrent cohorts on the same scale.

As the first step in the psychometric analyses, approximately 2,000 field supervisor reports were examined for administration irregularities with the conclusion that no answer sheets should be rejected on the basis of the review. Editing procedures were carried out on the 1972 and 1980 test batteries to insure that administrative and test format variations did not seriously affect subsequent cross-sectional comparisons. The results of the editing suggested that the picture number and mosaic comparisons tests should not be included in future cross-sectional comparisons. Test format changes make the 1972 to 1980 comparisons on the highly speeded mosaic comparisons test of questionable validity. The picture-number test was rejected for possible test administration problems. The editing procedures did not identify any problems with the remaining tests.

Item analysis statistics were computed for all tests in all administrations. The purpose of the item analysis was to investigate whether; (1) the tests were at the appropriate difficulty level, (2) the 1980 sophomore cohort battery had sufficient "ceiling" so that gains can be a reasonable expectation, and (3) the tests and possibly subtests have sufficient reliability to support reasonably accurate estimation of mean changes and changes in individual rank ordering over time.

The results of the item analysis suggest that the tests were slightly more difficult than would be suggested by measurement theory. However since the NLS and HS&B populations were characterized by considerable diversity in ability, one has to consider the tradeoff from having a test that may be on the easy side and, as a result, suffer from possible ceiling effects for some subpopulations. The item analysis results suggest a reasonable compromise was made.

With respect to reliability, there is little in the way of changes in reliability or standard errors of measurement when comparing NLS 1972 seniors with 1980 HS&B seniors. However in the longitudinal comparison there is a consistent gain in the reliabilities of the total test scores as one goes from the sophomore to the senior year. Similar gains in reliability were found for all the subtests with the exception of the biology subtest. It is suggested that future science score gains might be computed two ways--one with the biology items included and one with them left out.

The reliabilities were lower for blacks and hispanics when compared with whites, whereas standard errors of measurement were about the same, suggesting that the precision of measurement was about the same for all racial groups. The difference in reliabilities were apparently a function of smaller standard deviations for minority groups.

Of the total test scores, only the civics test was of sufficiently low reliability to question its use in any individual change score analysis. The subtests for the most part were not sufficiently reliable to justify their use as measures of change in individual rank ordering.

Confirmatory factor analysis was carried out in an effort to determine what the tests are and are not measuring; and whether what is being measured is the same across cohorts and selected subpopulations within cohorts. The factor analysis was carried out on rationally derived subtest "parcels" whose homogeneity was verified in the above reliability analysis.

The factor analysis results suggested that there is little if any change in factor structure either cross-sectionally (i.e., when comparing 1972 and 1980 senior cohorts) or in the longitudinal comparison of sophomores with seniors. With the exception of the writing style, punctuation parcels, and the physics parcels, the remaining subtest parcels seem to possess little or no unique reliable variance beyond that which can be explained by a verbal and/or mathematics factor. Black and hispanic factor structures were quite similar to white structures with the exception that performance on the science measures has a larger verbal component for hispanics than for whites. A similar finding, although less pronounced, is present when comparing the black structure with that of the whites. One somewhat surprising result is that there is no increased differentiation between the verbal and mathematics factors when going from sophomore to senior status (as measured by the factor intercorrelation). However, there is an increased differentiation between individuals (as measured by increased test score variance) as the transition from sophomore to senior takes place. It is possible that more achievement factors and additional factor differentiation would emerge if populations were defined by curriculum. Individuals in the academic curriculum would be more likely to take more specialized courses in their particular interest or skills areas. This should lead to more differentiation. In sum, there is little empirical evidence here for the notion that the tests or test parcels are measuring different things for different ethnic or sex groups.

Item response theory (IRT) was used to score tests within populations (sophomore to senior cohort), and to score and equate tests across populations. IRT methods were used to put mathematics, vocabulary, and reading scores on the same scale for 1972, 1980 and 1982 seniors. Similarly, IRT methods were used to score all the HS&B tests given to individuals as sophmores and repeated as seniors. The three parameter IRT model was used in preference to the one and two parameter models because of the possibility that guessing and/or speededness might be additional confounding sources of variance. The IRT analysis allowed one to compare how 1980 and 1982 seniors would score if they took the 1972 vocabulary, reading, and mathematics tests.

The results of the cross-sectional IRT equating suggest there is a continued decline in reading and mathematics scores from 1972 to 1980, and to 1982 in both the total population and in sex and race groups. Although vocabulary scores declined from 1972 to 1980 for seniors, they tended to level off between the 1980 and 1982 seniors in the total groups. Although the vocabulary decline appears to be arrested in the total group, both blacks and hispanics continue to show some decline between 1980 and 1982.

The results of the sophomore-senior longitudinal test score gains analysis using IRT scales suggested:

- The biggest gains over the two-year schooling period were in vocabulary and reading. Gains in math and science were considerably smaller on average. One might wonder why the biggest gains occurred in an achievement area that would seem at first glance less curriculum relevant. However, reading and vocabulary are skills that are central to achievement in all curriculum areas.
- Whites tended to show greater gains than did either of the other ethnic groups. This differential gain was more pronounced when whites were compared with hispanics.
- There was a consistent tendency for hispanic women to show greater gains than hispanic men. This may reflect curriculum differences as well as a differential drop-out rate. That is, lower scoring hispanic males may be more likely to stay in school than are their female counterparts.
- There is a consistent tendency for the test score variance to increase as one goes from the sophomore to senior year. This increase is the normal expectation when an educational treatment is applied.

Psychometric Analysis of NLS and HS&B Cognitive Tests

The cognitive tests used in the National Longitudinal Study of the High School Seniors Class of 1972 (NLS) and in High School and Beyond (HS&B) have a long and complex history, which is recorded, with one exception, only in an assortment of work statements, memoranda, progress reports, and unpublished project reports. The one exception is a preliminary analysis of the tests given in 1980 to the sophomores and seniors in HS&B (Heyns & Hilton, 1982). The purpose of this report is primarily to describe the psychometric analyses of the NLS and HS&B test batteries that were done as part of a study of Excellence in High School Education undertaken by Educational Testing Service (ETS) in the fall of 1983 under the sponsorship of the National Center for Education Statistics (NCES). A secondary purpose is to summarize in one place a number of previously unpublished reports that are important background to the psychometric work performed as part of the High School Excellence Study.

Brief Description of the Four Batteries and Their Interrelationships

1972 Senior Tests

In the spring of 1972, 18 randomly selected senior students in each of a sample of 1,044 randomly selected high schools were given a battery of cognitive tests[1] as part of the base year survey of the longitudinal study, which was to continue for an unspecified time. A total of 16,860 students completed the tests. As of this writing, four follow-ups have been conducted and a fifth follow-up is in the planning stage. The battery consisted of six tests, which are listed in the left-hand column of Figure 1. These tests and a brief description of each follows (additional descriptive material is included in a later section on the history of the development of the tests):

---

[1] The adjective "cognitive" is used in reference to a broad category of tests that might include basic intellectual skills, achievement, developed ability, and scholastic aptitude.

Vocabulary - Fifteen moderately difficult items consisting of one word followed by five possible synonyms. Test-taker selects one word or phrase whose meaning is closest to that of the stem. Time--5 minutes.

Picture-Number - Test of short-term associative memory, from the ETS Manual for Kit of Factor-referenced Cognitive Tests (Ekstrom et al., 1976) in which the test-taker first studies pairs of pictures and 2-digit numbers and then is shown the pictures only and is asked to select the number on the answer sheet that was paired with picture. Time--3 minutes to study 15 items in Part 1, and 2 minutes to answer; and similarly for Part 2.

Reading - Relatively unspeeded measure of reading comprehension in which 5 reading passages are given and test-taker answers a total of 20 multiple choice questions (each with 5 options) concerning what is stated or implied in each passage. Time--15 minutes.

Letter Groups - Test, from the ETS Manual for Kit of Factor-referenced Cognitive Tests, designed to measure inductive reasoning, consisting of five groups of letters among which four groups share a common characteristic and the fifth group is different. The test-taker indicates which group differs from the others. Time--15 minutes.

Figure 1

NLS and HS&B Tests

1972		1980		1982
Seniors				
Vocabulary (15)[a]	← 15[b] →	Vocabulary, Part 1 (15) Vocabulary, Part 2 (12)	← 9 →	Vocabulary (21)
Picture-Number, Part 1 (15) Picture-Number, Part 2 (15)	← 15 →	Picture-Number, Part 1 (15)		
Reading (20)	← 20 →	Reading (20)	← 8 →	Reading (20)
Letter Groups (25)				
Mathematics (25)	← 12[c] →	Mathematics, Part 1 (25) Mathematics, Part 2 (8)	← 18[d] → ← 0 →	Mathematics, Part 1 (28) Mathematics, Part 2 (10)
Mosaic Comparisons Parts 1 and 2 (89) Part 3 (27)	← 89 →	Mosaic Comparisons Parts 1 and 2 (89)		
		Visualization in Three Dimensions (16) "Questions About the Tests"		Science (20) Writing (17) Civics (10)
Sophomores				
(None)		Vocabulary (21)[e] Reading (20) Mathematics, Part 1 (28) Mathematics, Part 2 (10) Science (20) Writing (17) Civics (10)		(None)

---

[a] ( ) = Number of items.

[b] Indicates number of items in common.

[c] Six additional items are highly similar.

[d] Twelve items are common to the three senior class mathematics tests.

[e] 1980 Sophomore tests are identical to 1982 Senior tests.

Mathematics - Twenty-five items in which the test-taker indicates which of two quantities is greater, or equal, or that the data given are insufficient to make a decision. The items were selected to not require specific algebraic, geometric, or trigonometric skills. Time--15 minutes.

Mosaic Comparisons - This test, from the ETS Comparative Prediction Battery (French, 1964), was used as a highly speeded measure of perceptual speed and accuracy. One hundred and sixteen pairs of tile-like patterns require the test-taker to detect small differences in the design. Time--Part 1 (56 items) 3 minutes; Part 2 (33 items), 3 minutes; Part 3 (27 items), 3 minutes.

Total testing time - 69 minutes.

The test battery was administered prior to the student questionnaire by a survey administrator in each school, usually a guidance counselor or an experienced teacher. The front page of the test booklet and the instructions for each test and sample items are shown in Appendix A. (Qualified researchers can borrow full copies of the tests by writing T. L. Hilton, Division of Measurement Research and Services, Educational Testing Service, Princeton, NJ 08541.) The students marked their answers in a separate mark-sensed answer sheet, not in the test booklet.

1980 Senior Tests

In the spring of 1980, as part of High School and Beyond, 36 randomly selected seniors and 36 randomly selected sophomores were surveyed in each of 1015 high schools. Both the seniors and the sophomores were given test batteries that roughly paralleled the 1972 test. As shown in Figure 1, the 1980 senior tests were quite similar to the 1972 senior tests. Five of the 6 tests given in 1972 were repeated; 151 of the 164 items or 92% of the items in these 5 tests were identical. For reasons which will be explained shortly, the entire Letter Groups test was dropped, as well as parts of two other tests, to make room for a test of spatial relations (Visualization in Three Dimensions) and a self-report measure of the student's reactions to the testing situation ("Questions About the Tests"). Brief descriptions of these two instruments added to the 1980 senior test battery follow.

Visualization in Three Dimensions - This test, which was used in 1960 in Project TALENT (Flanagan et al., 1962), is a measure of "the ability to visualize how a figure would look after manipulation in three-dimensional space, by folding a flat figure to make a three-dimensional figure." Each of the 16 items in the test has a drawing of a flat piece of metal in the left-hand column and drawings of five objects on the right, only one of which could be made by folding the flat piece of metal. The test-taker selects the one object that could have been made. Time--9 minutes.

Questions About the Tests - This 6-item self-report questionnaire was designed to tap factors that may have prevented the test-takers from performing as well as they might have under optimum testing conditions. Included are questions inquiring about the importance of the testing to the students, their concern about doing well, how much they enjoyed participating, and how they felt while taking the tests. Time--5 minutes

The total 1980 senior test battery and the time allowed was as follows:

Vocabulary	
Part 1	5 minutes
Part 2	4 minutes
Reading	15 minutes
Mathematics	
Part 1	15 minutes
Part 2	4 minutes
Picture-Number	5 minutes
Mosaic Comparisons	
Part 1	3 minutes
Part 2	3 minutes
Visualization in Three Dimensions	9 minutes
Questions About the Tests	5 minutes
	Total time - 68 minutes

The test battery was administered *after* the questionnaires by the Test Administrator or School Coordinator, who were school staff members with limited survey responsibilities, while the Team Leader and Team Coordinator, who were NORC personnel with broad survey responsibilities, scanned the student questionnaires for completion of "critical items."

In 1982, as part of the first follow-up of the 1980 sophomore cohort, those cohort members who were still in the same schools were asked to take again the same tests they had taken as sophomores and under the same conditions. Sample members who had graduated early, or had transferred to another school, or had dropped out were located and given the tests in specially arranged small groups. The front page of the test booklet, instructions, and sample items for those tests which were new to the 1980 and 1982 test batteries are shown in Appendix A.

Certain additional details about the 1980 test administrations are described shortly.

1980 Sophomore Tests

For the sophomores the basic academic skill tests (Vocabulary, Reading, and Mathematics) were retained--with some changes at the item level and in the lengths of the tests--and three short conventional achievement tests were added. These were as follows:

Science - Twenty items measuring knowledge of general science, biology, chemistry, physics, and the scientific method. Each multiple choice item has a stem and five options. Time--10 minutes

Writing - Seventeen multiple choice items testing use of capitalization and punctuation, form, and style concerns. Each item has four options. Time--10 minutes

Civics Education - Ten multiple choice items covering graph reading (1), American history (2), American government (3) and miscellaneous current issues requiring inferential reasoning (4). Each item has four options. Time--5 minutes

Thus the total 1980 sophomore test battery and the time allowed was as follows:

Vocabulary	7 minutes
Reading	15 minutes
Mathematics	
Part 1	16 minutes
Part 2	5 minutes

Science	10 minutes
Writing	10 minutes
Civics Education	5 minutes
	Total time--68 minutes

1982 Senior Tests

This battery was simply a reprinting of the 1980 sophomore test battery, with changes only on the cover.

All of the original sophomores who were still in the same high schools two years later were in the retest sample, but the original sophomores who had graduated early, transferred to another school, or had dropped out were subsampled. Ninety-four percent of the in-school participants and 90 percent of the out-of-school participants (including transfer students) took the tests. Over 22,400 sophomore cohort members took the tests in both 1980 and 1982.

Common Items

As a result of the modifications of the tests from 1972 to 1980 and the differences between the sophomore and senior test batteries in 1980 and, thus, between the 1980 and the 1982 senior tests (since the 1980 sophomore tests are identical to the 1982 senior tests), there are only a small number of items that are common to the 1972, 1980, and 1982 senior tests. These common items are shown in Table 1. All told, 68% of the 1972 items are common to the 1972 senior and 1980 senior tests (assuming that the six 1980 Math items with editorial or format changes can be regarded as identical), but only 19% of the 1980 senior cohort items are common to the 1980 sophomore cohort, and 15% of the 1972 items are common to all three tests batteries. What might be regarded as a fourth battery, namely, the battery given to the 1982 seniors, was identical to that given to the 1980 sophomores.

Table 1

Common Items in Senior Test Batteries

1972 Item No.	Matching 1980 Item No.*	Matching 1982 Item No.
Vocabulary		
1	1	5
2	2	New
3	3	7**
4	4	10
5	5	11
6	6	New
7	7	13
8	8	15
9	9	New
10	10	New
11	11	New
12	12	18
13	13	19
14	14	New
15	15	21

Picture-Number - Part 1 (15 items) is identical in 1972 and 1980. The 1982 battery has no Picture-Number items.

1972 Item No.	Matching 1980 Item No.*	Matching 1982 Item No.
Reading		
1	1	New
2	2	New
3	3	New
4	4	New (Defective item, not scored)
5	5	New
6	6	14
7	7	15
8	8	16
9	9	17**
10	10	10
11	11	11
12	12	12
13	13	13
14	14	New
15	15	New
16	16	New
17	17	New
18	18	New
19	19	New
20	20	New

Letter Groups - No Letter Groups items were used in 1980 or 1982

*Number in column is the number of the test item that is identical to the 1972 test item in that row.

**Minor item differences judged to be trivial.

Table 1 (continued)

Common Items in Senior Test Batteries

1972 Item No.	Matching 1980 Item No.	Matching 1982* Item No.
Mathematics, Part 1		
1	New to '80	New to '82
2	2	2
3	3	3
4	4	4
5	5	5
6	6 Edit change only	6 Same as '80
7	New to '80	New to '82
8	New to '80	New to '82
9	New to '80	New to '82
10	10	10
11	11 Edit change only	11 Same as '80
12	12	12
13	13	13
14	14 Format change	14 Same as '80
15	15 Format change	15 Same as '80
16	16	16
17	17	17
18	18 Edit change only	18 Same as '80
19	New to '80	New to '82
20	20	20
21	21	21
22	22 Edit change only	22 Same as '80
23	New to '80	New to '82
24	24	24
25	New to '80	New to '82
		26 New to '82
		27 New to '82
		28 New to '82
Mathematics, Part 2	1980 Items	1982 Items
	1	1 New to '82
	2	2 New to '82
	3	3 New to '82
No test	4	4 New to '82
	5	5 New to '82
	6	6 New to '82
	7	7 New to '82
	8 (Defective item, not scored)	8 New to '82
		9 New to '82
		10 New to '82
Mosaic Comparisons		
Part 1-56 items	Identical to '72	No test
Part 2-33 items	Identical to '72	No test
Part 3-27 items	No test	No test

Note: None of the remaining tests was common to any of the batteries. The 1980 sophomore battery was identical to the 1982 senior battery.

*The 1982 Math test, Part 1, contained 28 items and took 16 minutes.

Differences in Administration and Format

Although the purposes and general setting of the 1972, 1980, and 1982 test administrations were comparable, there were certain differences that may have significance in interpreting any observed differences in score distributions across the years. Accordingly, each administration will be briefly described and certain dissimilarities will be pointed out.

1972 Administration

The test data collection was conducted by Survey Administrators, usually appointed by the school superintendent of the school district or the principal of the participating high school, as part of the data collection for the base-year survey. Because the survey was undertaken late in the spring of the school year--typically in the month of April--approximately 10% of the schools agreed to participate only if they did not have to conduct the test administration. Another 10% of the schools either refused to participate or could not do so because of early closing dates. Thus, the school participation rate was 80%.

Eighteen seniors were randomly selected for participation by Educational Testing Service from rosters sent to Princeton by each participating school. Five additional students were randomly selected as replacements in the event any seniors in the primary sample refused to participate. Although no incentive, financial or otherwise, was offered for participation, and participation was voluntary, a high percentage of the students agreed to participate. Useable student questionnaires were obtained from 88% of the students and 95% of these students participated in the testing. (NCES, 1983, p. 38)

The eighteen students typically were assembled in a classroom and, in accordance with the 18-page Survey Administrator's Manual, were first given the test battery and, then, following a ten-minute break, the student questionnaire. The Survey Administrator's Manual provided detailed directions for seating and supervision of the students and for arranging make-up sessions.

1980 Administrations

In 1980, 36 sophomores and 36 seniors were randomly selected for participation within each high school. Useable student questionnaires were obtained from 82% of the sample members and 88% of these students participated in the testing. (NCES, 1983, p. 38). The students were assembled in classrooms or in a cafeteria or auditorium. In contrast to the NLS procedure, the tests were administered after the questionnaires, while NORC personnel checked the student questionnaires for completion of "critical items." In some unknown fraction of the schools, presumably small, the sophomores and seniors were given the tests at the same time despite differences in the timing and instructions for the tests. Some other differences between the ways in which test data were obtained in 1972 and 1980 are discussed in the following sections.

Other Administrative Differences

1. Guessing instructions. In 1972 the students were not told how the tests would be scored, i.e., that there would be a penalty for guessing, whereas in 1980 the students were told that their "score on each section will be the number of correct answers minus a percentage of the number of incorrect answers. Therefore, it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices." The one exception was the test of Visualization in Three Dimensions in which the students were told that their score

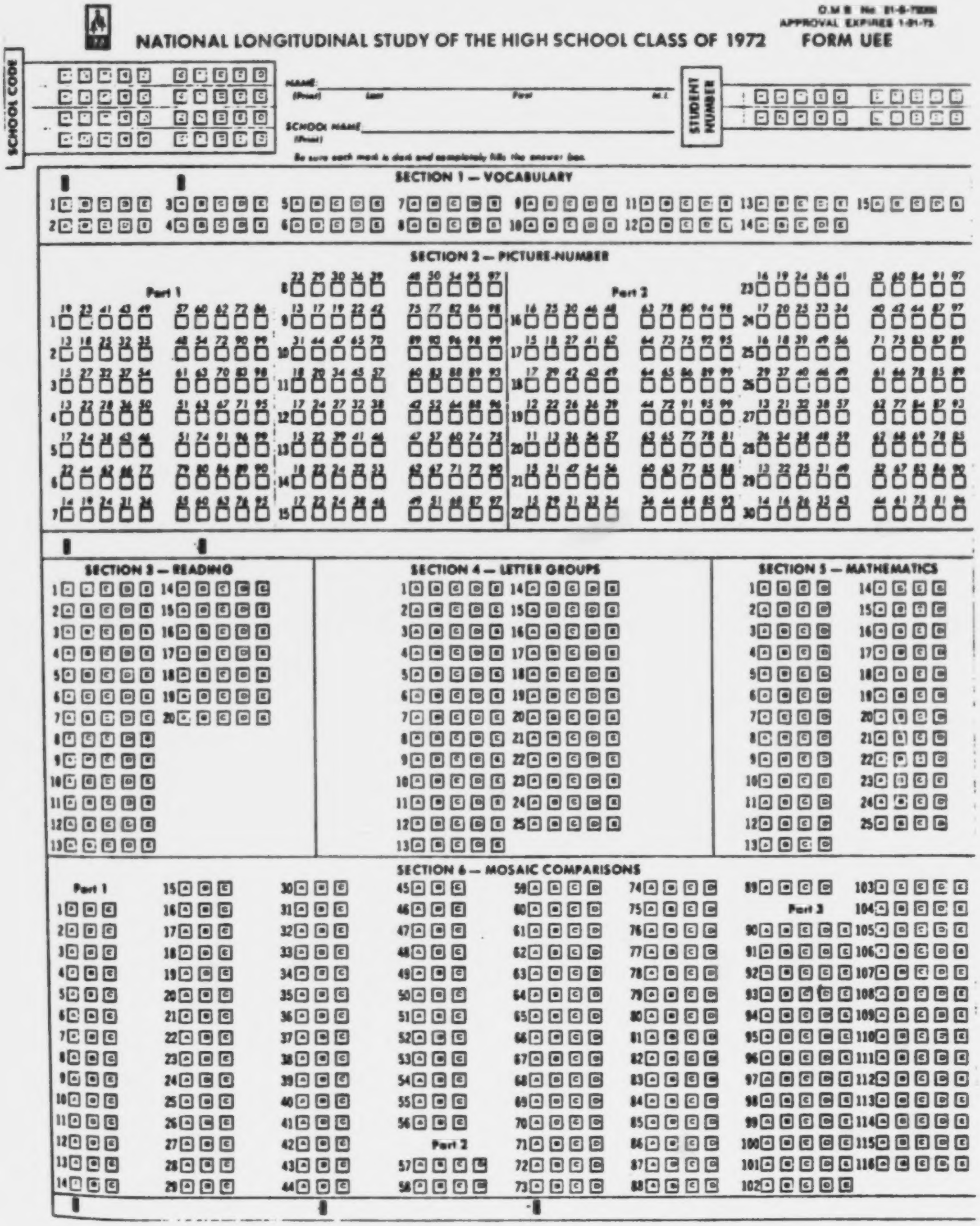
would be the "number of correct answers." (The purpose of this exception was to make the instructions for this test parallel to the procedures followed in Project TALENT (Flanagan et al., 1962) from which the test was reproduced.) In both 1972 and 1980 the tests were scored by formula (S=R-W/(n-1), where R is the number right, W the number wrong, and n is the number of choices in each item) with the exception of Visualization in Three Dimensions, which was scored number right. In a recent study, Angoff and Schrader (1984) demonstrated that formula scores are invariant with respect to directions. The wording of the instructions given the students in the Angoff-Schrader experiment differed somewhat from that used in the 1972 and 1980 administrations and also the sample characteristics differed (college applicants vs. high school seniors). Thus, their results may not be generalizable to the present case. If not, then the absence of formula instructions in 1972 may have favored that sample.

2. Answer sheets. In 1972 the students marked their answers on an answer sheet separate from the test booklet. A copy of the sheet is shown on the following page. In 1980, however, the students marked their answers in the test booklet by blackening ovals adjacent to the options they selected. (Some examples are shown in the sample items in the Appendix A.)

A second difference was that the 1972 answer sheet required the student to blacken a box, whereas NORC asked students to completely fill in an oval. On the answer sheet, the 1972 students were told to "Be sure each mark is dark and completely fills the answer box."

Third, the separate 1972 answer sheet did not precisely map the format of the test booklet, i.e., the arrangement of item response grids into columns on the 1972 answer sheet did not match the columns in the

Figure 2



O.M.B. No. 51-S-72[illegible]
APPROVAL EXPIRES [illegible]

NATIONAL LONGITUDINAL STUDY OF THE HIGH SCHOOL CLASS OF 1972 FORM UEE

SCHOOL CODE

NAME: (Print) Last First M.I.

SCHOOL NAME (Print)

STUDENT NUMBER

Be sure each mark is dark and completely fills the answer box.

SECTION 1 — VOCABULARY

SECTION 2 — PICTURE-NUMBER

Part 1

Part 2

SECTION 3 — READING

SECTION 4 — LETTER GROUPS

SECTION 5 — MATHEMATICS

SECTION 6 — MOSAIC COMPARISONS

Part 1

Part 2

Part 3

test booklet. For example, the Mosaic Comparisons items in the test booklet had 12 items in each column whereas the answer sheet had 14 items in each column.

It is difficult to know exactly what the net effect of these format differences was, but it seems likely that, on balance, the 1980 format saved the respondent a substantial amount of time, particularly on the Mosaic Comparisons Test, which is a speed test. A team at the Air Force Human Resources Laboratory conducted an experiment in which the effect of several similar format differences were examined (Earles et al., 1983). They concluded that the net effect was highly significant for speeded tests--amounting to nearly one-half a standard deviation for the most speeded test. The design of their experiment did not permit the estimation of the relative magnitude of the different sources of effects.

3. Administration date. Because the contract for the 1972 data collection was awarded later in the academic year than the award for the 1980 data collection, the 1972 test administrations in the schools were conducted approximately one month later in the school year than was the 1980 administration. Since the tests in question were measures of aptitude or developed ability in contrast to content specific tests and both administrations were conducted late in the senior year--generally regarded as a time of little learning--we suppose that this discrepancy made at most a slight difference in performance. For another reason, however, many--perhaps 25%--of the 1972 students may have been at a disadvantage in that they were given the tests during the last week of school, a week of many distractions. We would guess that this counter-balanced any advantage the 1972 sample in general may have had from being tested one-month later than the 1980 students.

4. Order of the tests within the battery. As shown below, the order in which the tests were given in 1972 differed from the order in 1980. What effect this change in order may have had is unknown, although it seems likely that fatigue increases and motivation decreases towards the end of the testing. If so, then the order might have favored the 1980 students since the tests which were not common to the two administrations (Letter Groups in 1972 and Visualizations in Three Dimensions in 1980) were given fourth in 1972 and last in 1980).

1972	1980
Section 1. Vocabulary	Section 1. Vocabulary (Parts 1 & 2)
Section 2. Picture-Number (Parts 1 & 2)	Section 2. Reading
Section 3. Reading	Section 3. Mathematics (Parts 1 & 2)
Section 4. Letter Groups	Section 4. Picture-Number
Section 5. Mathematics	Section 5. Mosaic Comparisons (Parts 1 & 2)
Section 6. Mosaic Comparisons (Parts 1-3)	Section 6. Visualization in Three Dimensions

5. Order of questionnaire and test administration. As noted earlier, in 1972 the tests were given first and then the student questionnaires, whereas the order was reversed in 1980. Again, we know of no directly relevant methodological studies investigating the possible effect of such a reversal in order but it seems likely that completing a long and complicated questionnaire (33 pages for the sophomores and 35 pages for the seniors) just prior to the test administration would have had a deleterious effect on the performance of the 1980 test-takers because of fatigue.

6. Seating and other instructions. In 1972 the Survey Administrators were given detailed instructions about seating the students so as to make

copying and collaboration difficult (for example, "seat students in alternate rows") whereas no such instructions were given in 1980. In addition, only in 1972 were instructions given about prohibitions in the testing room (no books, slide rules, etc.) and how routine absences, mistimings, emergencies, and other problems should be handled.

7. Supervision. Only in 1972 were the staff instructed to "walk around the room" during the administration of the test. Presumably, in 1980 the school personnel or NORC representatives present were busy checking the student questionnaires during the test administration. Any reduction in supervision in 1980 might have encouraged collaborating but, on the other hand, any added supervision in 1972 might have resulted in a more controlled testing situation conducive to test performance.

8. Timing of Picture-Number Test. In 1972 the survey administrators were instructed to tell the students that they would have three minutes to study Part 1, and at the end of three minutes to tell them to turn to the test page for Part 1. Two minutes later the students were told to stop. In 1980 the survey administrators were not instructed to tell the students when three minutes were up, although the test booklet informed them that they would have only three minutes to study part one and then two minutes for the test questions. What effect this difference had is uncertain. If it resulted in the 1980 students' taking more than 3 minutes to study Part 1, then the effect may have been nontrival.

9. Group size. In 1972, the typical testing session included 18 students, whereas in 1980 36 to 72 students were tested together depending on whether the sophomore and senior subjects were tested in separate rooms or together. This may have resulted in more distractions

in 1980, but it also may have made it easier for students to collaborate if any were so inclined. With one exception we would expect the distractions of the larger group to be the more important factor. The exception was the Picture-Number Test, which may well have had inflated scores in 1980 because of the difficulty of supervising the larger groups. Fetters tested this hypothesis by computing the regression coefficients of Picture-Number Test formula scores on test-group size while controlling for the students' self-reported grade average, curriculum, sex, race, and socioeconomic status (1984). In both 1972 and 1980, the coefficients were positive and significantly greater than zero. Thus, the effect of the larger groups in 1980 may have been appreciable although Fetters estimated that at most it would account for less than 50 percent of the higher mean in 1980. (1984, p. 7)

Summary

On balance what can we say about the effect of differences between the 1972 and 1980 test batteries in their format and administration? Table 2 summarizes our best guess as to which administration would be favored by the difference cited above. Weighting a slight advantage as one and a moderate advantage as two, the "score" would seem to be 3 to 6 in favor of the 1980 administration. In view of our uncertain knowledge of the true magnitude of the effects discussed, the cautious position would be that neither administration had an advantage. A less cautious conclusion is that the 1980 subjects probably had some small advantage and that the advantage may have been greater on some tests than others, e.g., tests requiring close supervision and timing.

Table 2

Administration Favored by Differences in Administration

	1972	1980
Guessing instructions	*	
Answer sheets		
a. In booklet		**
b. Marking space	-	-
c. Mapping of tests and answers		**
Administration date	-	-
Order of the tests		*
Order of questionnaire and test administration	**	
Seating and other instructions		*
Supervision	-	-
Group size	-	-

- = No difference
* = Possible slight advantage
** = Possible moderate advantage

History of Development of Tests

Having briefly described the NLS and HS&B tests and their administration, we will in this section recount the history of their development from 1971 to the present. We do this partly to document a line of developmental research that has important implications for educational research in this country, and partly to assist the reader in understanding the purposes and proper uses of the test scores.

The 1972 Tests

That the data collection for the National Longitudinal Study of the High School Class of 1972 should include one or more measures of student ability was originally recommended in a design for the study prepared in 1971 by Research Triangle Institute under contract with the National Center for Education Statistics (Horvitz et al., 1972). The design report described the objectives of the study as follows:

> The survey is expected to provide needed insights into the significant alternative patterns of development experienced by students beyond high school, detailed information on the factors affecting these patterns and methods for relating the occupational and postschool experiences of individuals to their school experience.

Later in the report the first of ten main objectives listed was as follows:

1. To identify factors associated with alternative postsecondary school career choices and students' persistence in these choices.

Of six broad categories of factors which determine postsecondary school career paths, the first was "the student's ability, especially in the cognitive area." (p. 19) To measure student's ability, the authors proposed to use the student questionnaire with one exception: this was that the student's intelligence should be measured through "an objective IQ test": the Quick Word Test, a 100-item multiple choice vocabulary test (Borgatta & Corsini, 1967).

A field test of the instruments designed by the RTI staff included the Quick Word Test. The results, however, caused the RTI staff to recommend that the test be eliminated. "The student's own classification of his ability...together with his overall grade point average and rank in class should provide a sufficient measure or index of ability." (p. 193) Nevertheless, the Request for Proposals for the base year survey of NLS-72 specified that the Quick Word Test would be used. Moreover, in responding to the RFP, Educational Testing Service not only endorsed the idea of including an objective measure of vocabulary, but also recommended that the measurement of student ability be broadened to include "other measures of verbal aptitude and other forms of basic skills which have been shown to be important predictors of academic or vocational training and on-the-job performance" (Hilton, 1971, p.4-8). A second reason for considering measures to supplement the QWT was that "legitimate issues can be raised regarding its appropriateness for minority group members from culturally disadvantaged backgrounds." (p. 4-8).

On January 27, 1972, NCES awarded the contract for the base year survey to ETS and endorsed the concept of expanding the coverage of the cognitive testing. It is important to note, however, that the primary purpose of the expanded battery of tests continued to be to enhance the prediction of career development choices and outcomes.

A team of 16 ETS professional staff members immediately undertook the design, clearance, pretest, review, revision, and production of the new test battery--a series of tasks completed in an eight-week period. (Hilton & Rhett, 1973)

The final composition of the battery represented a balancing of somewhat opposing considerations. The primary objective was to obtain a more comprehensive description of students whose backgrounds, ethnicity, and socioeconomic status were quite diverse. At the same time, the need for comprehensive measures had to be balanced with the requirement of minimal testing time. Lengthy tests are a nuisance to schools that must schedule time to administer them and to students who must endure them without significant fatigue or loss of interest. For this reason, the battery was held to 69 minutes of testing time plus 36 minutes of administrative time for a total of 105 minutes.

The tests were constructed to measure five distinct factors in a reasonably short period. They were selected on the basis of their efficacy in other ETS programs or projects, two of which were the Comparative Guidance and Placement Program (CGP), a guidance service for two-year colleges, and Project Access (a project for minority youth).

Many of these tests existed even before the development of CGP and Project Access. Variations of some of the tests had been assembled by ETS in the Manual for the Kit of Factor-referenced Cognitive Tests and made available to researchers throughout the country for experimental study. Thus, the tests used in NLS represented instruments already established in psychometric research.

A brief description of each test, abstracted from Hilton & Rhett, 1973, and a summary of their psychometric properties follow. (A complete analysis of each test, based on data from the base-year survey, can be obtained from T. L. Hilton, ETS.)

> Vocabulary. A brief test using synonym format consisting of items drawn from the longer Project Access Vocabulary Test. The items were selected to avoid academic or collegiate bias and to be of an appropriate level of difficulty for the NLS twelfth grade population. The 15 items selected were those that constituted the then current CGP Vocabulary Test.
>
> Reading. Based on short passages (100-200 words) with several related questions concerning a variety of reading skills (analysis, interpretation) but focusing on straightforward comprehension. The Reading Test drew upon items from the CGP Reading Test and items of particular relevance to minority group students taken from the Project Access Reading Test.
>
> Mathematics. The items are quantitative comparisons in which the student indicates which of two quantities is greater, asserts their equality or the lack of sufficient data to determine which quantity is greater. This type of item is relatively quickly answered and provides measurement of basic competence in mathematics at the same time minimizing the amount of time required for actual computation. The test is a shortened version of the CGP and Project Access instruments

but omits those items that tap algebraic, geometric, or trigonometric skills.

Letter Groups. This test of inductive reasoning requires the student to draw general concepts from sets of data or to form and try out hypotheses in a nonverbal context. The items consist of five groups of letters among which four groups share a common characteristic and the fifth group is different. The student indicates which group differs from the others. The test was used in exactly the same form in which it appeared in both the Project Access and CGP test batteries.

Letter Groups, as a test of inductive reasoning, measures one of the four aptitudes (verbal, quantitative, reasoning, and spatial/perceptual), which have considerable precedent in representing the varieties of cognitive skills. Tests of inductive reasoning have, in particular, been shown to be useful in research involving minority ethnic groups (Lesser, Fifer, & Clark, 1965; Stodolsky & Lesser, 1967; Flaugher, 1971). This test, in combination with the Mathematics Test that was included in the battery, provided a measure of the reasoning capacity of students. It also may have a verbal component: in a study of persistence in higher education, a confirmatory factor analysis showed it to have a loading on "performance aptitude" which in turn had a correlation of .77 with "verbal aptitude." (Hilton,1982, p.9)

Mosaic Comparisons. Measures perceptual speed and accuracy through items that required that small differences be detected between pairs of otherwise identical mosaics or tile-like patterns. A deliberately speeded test, it has three separately timed sections consisting of increasingly more complex mosaic patterns. Mosaic

Comparisons, a test in the CGP battery, represented another of the fundamental measures used in many studies of aptitudes among minority groups. Tests like this which represent the spatial/ perceptual domain were selected for the 1972 battery--to allow minority students an opportunity to perform better than on other cognitive instruments.

Picture-Number. This test of associative memory consists of a series of drawings of familiar objects, each paired with a number. The student, after studying the picture-number pairs, is asked to recall the number associated with each object. This test appeared in both the CGP and Project Access batteries.

The inclusion of the Picture-Number Test represented acknowledgment of a line of research that suggested that minority populations have relatively higher mean scores in associative memory than in other types of ability (Semler & Iscoe, 1963; Rohwer, et al., 1968; Jensen, 1968).

Results from item and test analysis conducted in 1973 indicated that the 1972 test battery had quite satisfactory test characteristics. Comparison of the performance of White and Black students showed the White means to be uniformly higher by about one standard deviation except on Picture-Number on which the discrepancy was .7 standard deviations. These results and a number of studies supporting the predictive validity of these measures are described in Hilton and Rhett, 1973.

The sequential order of the tests was chosen because it interspersed the three more conventional and the three more novel tests, an arrangement that provides interest and motivation for the examinees. Vocabulary was chosen for the first position because of the inherent simplicity of this test's format and directions. At the outset, it was believed that the Vocabulary Test should build the confidence of the students in their capability to perform well. Because it is quite speeded, Mosaic Comparisons was placed last to prevent any anxiety that might be engendered by this speededness from persisting in later test sections.

The 1980 Tests

In the spring of 1978, ETS was given the contract to "revise" the 1972 test battery so as to make the battery suitable for administration to two new cohorts of high school students, namely, the cohorts that became known as the 1980 HS&B Seniors and the 1980 HS&B Sophomores. The expectation of NCES was that some of the items in the 1972 test battery and possibly some of the tests would need to be replaced. The Work Statement transmitted to ETS stressed that it was "of the utmost importance that scores be obtainable from the revised instrument(s) that are statistically comparable to scores on the 1972 battery."

In accordance with this charge, ETS, after weighing the pros and cons of a range of alternative solutions to the increasingly complex requirements of the cognitive tests, submitted a test plan to NCES (Donlon et al., 1978). This plan recommended that the Letter Groups, Picture-Number, and Mosaic Comparisons tests be dropped--primarily because a survey of users of the 1972 public release tape and of the research literature indicated that the tests had been little used--and that two tests be added to the batteries for Grade 10 and Grade 12 (Science, and Career and Occupational Development) and in addition that a spatial relations test (Surface Development) be added to the Grade 10 battery and Abstract Reasoning to the Grade 12 battery.

These recommendations were accepted by NCES and the revised batteries were field tested by NORC, with ETS conducting the test analyses (Hilton et al., 1980). When, however, the results were submitted to the National Planning Committee for "High School and Beyond"[1], the design of the batteries was challenged. As described in some detail elsewhere (Heyns & Hilton, 1982), the Committee recommended to NCES that:

> the draft batteries be altered substantially to allow for the measurement of school effects and cognitive change in a longitudinal framework. The concerns of the Committee were twofold: First, conventional measures of basic cognitive skills are not designed to assess patterns of change over time, and there was strong feeling that the preliminary batteries would not be sufficiently sensitive to cognitive growth to allow analysts to detect differential effects among students. Second, the Committee recommended including items that would be valid measures of the skills or material a student might encounter in specific high school classes.

Accordingly, after considerable discussion and consultation, the batteries were revised to, in brief, make the 1980 senior tests primarily a vehicle for measuring cross-sectional change from 1972 to 1980 and the 1980 sophomore tests a baseline for the measurement of longitudinal change from 1980 to 1982. The final form of the tests is described in the first section of this report. This form is the result of a complex sequence of decisions and represents a compromise between several competing motivations: to preserve comparability with the 1972 battery but to introduce new measures more sensitive to school achievement; to maximize validity but to minimize testing time; to achieve a common scale for the sophomore and senior tests but to target measurement at each level.

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[1] The members of the National Planning Committee were Robert F. Boruch, Bruce K. Eckland, Barbara Heyns, David S. Mundel, Robert C. Nichols, Ellis B. Page (Chair), Sally B. Pancrazio, and David E. Wiley. Edith M. Huddleston, NCES, was the original Project Officer for "High School and Beyond."

Whether each of the changes made was justified remains to be seen. The results of the item and test analysis are described in the balance of this report, and the research analyses that make use of the tests will be described in subsequent project reports.

Preliminary Analysis of Data

Examination of Field Administrators Reports

As a first step in the psychometric analysis of the test batteries, the ETS staff obtained from NORC copies of the reports by the NORC field staff who supervised the administration of student questionnaires and the test batteries in each participating high school.[1] Approximately 2,000 field supervisors' reports covering the 1980 sophomore and senior administrations, the 1982 senior administrations, and various special administrations conducted for transfer students and dropouts were received from NORC. The ETS staff examined these one-by-one to identify those that cited any problems that might have affected the test scores. A total of 97 reports included remarks suggesting there may have been events and conditions that might have reduced the validity of the test results. See Table 3.

Practically none of the reports indicated unequivocally that the answer sheets for a particular high school should be rejected. Eighteen of the supervisors reported incidences such as bomb scares (2), typhoon warnings (1), and shootings--of a teacher and three students on the morning of the data collection (1). A number of schools had fire drills during the data collection (typically they did not say whether it was during the test administration). Twenty-seven schools reported that the data collection was conducted in a cafeteria or an auditorium or

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[1] We are indebted to Calvin Jones, NORC, for his able assistance in making these data available.

Table 3

Summary of Unusual Circumstances Reported[1]

	1980 Sophomores and Seniors	1982 In School	1982 Out of School	Total
Confusion, chaos, bomb scare, fire alarm, burglar alarm, shootings, and tornado alert	9	7	2	18
Noise, distractions, and interruptions	10	6	2	18
Lack of cooperation, students unruly, and hostility	7	0	2	9
Sophomores and seniors together	10	-	-	10
Drug usage in room	1	-	1	2
Problems judged to be inconsequential	22	16	2	40
Total	59	29	10	97

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[1] The 97 reports summarized here were screened from approximately 2,000 reports received from NORC.

a library where students were constantly moving in and out or were noisy or that the band was playing in the next room or outside, or that the PA system was constantly blaring, or that some "kids were making a ruckus in the back of the room." Ten supervisors volunteered the information that the seniors and the sophomores were surveyed in the same room at the same time.

The results of this examination of field supervisors' reports were carefully considered by the project staff in consultation with other senior staff experienced in the effect of testing conditions on student performance. Two factors precluded certain corrective steps that might be taken. The first was that the ETS staff could not link the supervisors' reports to data on the public release data tape without making elaborate arrangements to protect the privacy of the schools. The second was the absence of any kind of objective rules by which to reject the data from a particular school. For example, how distracting is a bomb scare in comparison to a band rehearsal next door. In view of these factors and the knowledge that editing of the data by other means would be considered, it was decided not to pursue the rejection of data on the basis of the supervisors' reports.

Editing of the Test Data

Prior use of the HS&B data by ETS staff in various studies has indicated that in general the public release file is relatively free of data processing errors and that the students' questionnaire responses and test responses by-and-large seem to have validity (see, for example, Hilton, Schrader, & Beaton, 1983). The test scores appear to correlate with other test scores about as one would expect of valid measures of student ability. For two reasons, however, it was deemed possible that the test data might--for a small fraction of the total cases--be defective. The first reason was based on the field supervisors' reports. As discussed above these reports indicated that, in some small subset of the participating high schools, testing conditions and procedures may have departed sufficiently from the usual conditions and procedures to raise doubt about the appropriateness of using the data from these schools in a definitive study of test score changes from 1972 to 1980 and from 1980 to 1982.

The second reason was based on a preliminary analysis of the test score changes from 1972 to 1980 by Beaton and Hilton (unpublished). These results indicated that the mean scores for the seniors from 1972 to 1980 decreased somewhat in Reading and Vocabulary but increased dramatically for Picture-Number and Mosaic Comparisons.

Several possible explanations can be offered for the large gains, including the possibility that some intervening influence (e.g., television, video games) has contributed to the development of new skills. Before such an interpretation is considered, however, an alternative explanation for the large score gain needed to be considered: this concerned the nature of the test administration and the unique attributes of the tests that showed large gains. As described earlier in this report, the Picture-Number test, designed to measure short-term memory, requires that the test-taker study pairs of pictures and numbers, and not turn back to them after turning the page to the section where only pictures are given.

Making sure that the test-takers do not turn the page back requires close supervision. Lapses in the supervision could result in inflated scores.

The Mosaic Comparisons test also requires conscientious supervision in that it is a highly speeded test. If time limits are not strictly observed, inflated scores will result from this test also.

Examining the test data for defective scores would be highly desirable in any case because of their important role in the study. Such an examination was done by Beaton, Hilton, and Schrader in 1980 when data from Project TALENT and the 1972 NLS cohort were used to examine the SAT score decline from 1960 to 1972 (Hilton & Schrader, 1980).

The objective of the editing was to maximize the rejection of defective scores and minimize the rejection of nondefective scores. The problem is that one cannot assume that the scores on all the tests given within a particular school are defective simply because the scores on a particular test are seriously inconsistent. The Mathematics test, for example, may have been administered with care, and the Mosaic Comparisons test may have been carelessly timed. If, however, the results of other editing checks point to a particular set of data as defective, then we would accept the hypothesis. Thus, we pursued a conservative multiple criterion approach to the editing. In order to make the 1972 senior test data comparable to the 1980 senior data, it was decided to edit the 1972 data using similar procedures to those used for the 1980 data.

At the school level, the problem was to identify schools with mean test scores having unusually large deviations from predictions based on other test scores. We also anticipated that examination of the students' responses to Questions About the Tests might also raise questions about the validity of the responses for a particular school. School-by-school analysis of the questions relating to distractions might identify schools in which standard testing conditions were not maintained.

At the individual level, the problem was to identify students whose test performance in general or whose performance on a particular test was seriously discrepant from what would be predicted on the basis of other student data. For example, students whose performance may have deteriorated towards the end of the test battery (through fatigue, or some disturbing condition or influence) could be identified by predicting expected performance on the basis of performance on the earlier tests in the battery.

In the following paragraphs, the results of a fairly large number of editing studies will be briefly summarized.

1. First-half mean versus second-half mean. If the administration of a particular test was mistimed, then the mean score on the items in the last half of the test should deviate from what would be predicted on the basis of performance on the first-half of the test. Accordingly, for each test common to both the 1972 and the 1980 batteries, the mean scores of each school on the second-half of each test were regressed on the mean scores on the first-half of the test. The results, shown in Table 4, indicate that for most of the tests the first-half and the second-half were highly correlated and that the results for 1972 were generally similar to the results for 1980. The three exceptions were the higher means scores in 1980 on the second-halves of the

Picture-Number Test and Parts 1 and 2 of the Mosaic Comparisons Test. However, the more important observation for editing purposes was that there were very few school means that one would regard as outliers. Figures 3 and 4, for Vocabulary and Mosaic Comparisons, Part 2, are typical.

2. First-half mean versus second-half attempts. As the second possible basis for editing, the regression of mean scores on the first-half of each test on the mean number of items attempted in the second-half of each test was examined. As shown in Table 5, the results indicated that the 1980 sample attempted more items, especially on the Picture-Number and the Mosaic Comparisons Tests but, again, examination of the scatter-plots showed relatively few outliers.

3. Mean SAT scores versus second-half means. To investigate whether scores on an independently administered test would provide a basis for detecting outliers, mean scores were computed for those students within each school who took the SAT and then--for those schools with 10 or more SAT takers--regressions similar to the preceding regressions were computed.[1] The correlations between SAT Total and the 1972 and 1980 second-half means ranged from .21 for Picture-Number to .86 for Mathematics, but examination of the residuals from prediction revealed no more than one would expect by chance. Repeating the analysis for SAT-Verbal scores did not appreciably change the results.

4. Distraction scores. For the 1980 sample only, it was possible to construct a scale from those items in the Questions About the Tests that seemed to reflect the extent to which each test-taker may have been distracted during the test administration. However, this scale

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[1] SAT scores were retrieved for the 1980 seniors as part of a study conducted at ETS for the U. S. Army Recruiting Command (Hilton et al, 1983).

Table 4

Mean Scores and Correlation Coefficients (r) Between First- and Second-Halves of Test Items for 1972 and 1980 Seniors

	1972			1980		
	$\bar{x}$		r	$\bar{x}$		r
Test	1st half	2nd half		1st half	2nd half	
Vocabulary	4.1	1.9	.82	3.7	1.8	.81
Reading	5.9	3.4	.83	5.3	3.1	.87
Math, Common	3.8	2.3	.85	3.6	2.0	.87
Picture-Number	4.3	4.2	.74	5.0	5.8	.91
Mosaic Comparisons 1	15.0	6.7	.25	15.2	11.2	.36
Mosaic Comparisons 2	11.9	4.0	.31	11.7	6.3	.53

Table 5

Mean Scores and Correlation Coefficients (r) Between Number of Attempts in First-Half of Items and Number of Attempts in Second Half

	1972			1980		
	$\bar{x}$		r	$\bar{x}$		r
Test	1st half	No. of attempts		1st half	No. of attempts	
Vocabulary	4.1	6.8	.23	3.7	7.3	.04
Reading	5.9	9.2	.37	5.3	9.6	.36
Math, Common	3.8	5.7	.29	3.6	5.9	.29
Picture-Number	4.3	5.1	.62	5.0	7.1	.76
Mosaic Comparisons 1	15.0	7.5	.12	15.2	12.7	.24
Mosaic Comparisons 2	11.9	4.7	.07	11.7	7.7	.29

Figure 3

Bivariate Distribution of School Means on First-half and Second-half of Vocabulary Test for 1980 Seniors

```
                                                 1ST HALF TEST
                   -3   -2   -1    0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   TOT.

2ND HALF TEST
          10                                                                                                                 0

           9                                                                                                                 0

           8                                                            1                                                    1

           7                                                                                                                 0

           6                                                       5    2                                                    7

           5                                                  2    8                                                        10

           4                                             2   19    8    1                                                   30

           3                                        3   60   73    7                                                       143

           2                              1    4   78  233   72    2    1                                                  391

           1                              3   63  157   79    7                                                            309

           0                         1   12   38   16    3                                                                  70

          -1                              1    1                                                                             2

          -2                                                                                                                 0

       TOTAL        0    0    0    1   17  106  254  377  173   30    5    0    0    0    0    0    0    0    0    0    0   963

       GROUP                 N       MIN          MAX          MEAN        SD N        SD N-1

1ST HALF TEST              963     0.2188       7.0003       3.7143      1.0285      1.0294
2ND HALF TEST              963    -1.2503       7.6336       1.8056      1.0157      1.0162
R=     0.8058
```

Figure 4

Bivariate Distribution of School Means on First-half and Second-half of Mosaic Comparisons Test, Part 2, for 1980 Seniors

```
                                                  1ST HALF TEST
               -3   -2   -1    0    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   TOT.

2ND HALF TEST
  38 -   40                                                                                                              0

  34 -   38                                                                                                              0

  30 -   34                                                                                                              0

  26 -   30                                                                                                              0

  22 -   26                                                                                                              0

  18 -   22                                                                                        1                     1

  14 -   18                                                                              3    4    5                    12

  10 -   14                                                                    1    3   18   37   10                    69

   6 -   10                                                   2    2    9   10   51  111  211   13                   409

   2 -    6                                              4    2   12   19   40   93  142  119    6                   437

  -2 -    2                   17    1              1    2    1    3    1    4    3    2                               35

  -4 -   -2                                                                                                              0

  TOTAL         0    0    0   17    1    0    0    1    2    5    7   15   32   54  149  274  371   35    0    0    0   963

     GROUP              N       MIN         MAX         MEAN        SD N        SD N-1

1ST HALF TEST          963      0.0       14.0000     11.7243     2.1317      2.1328
2ND HALF TEST          963   -0.1111      19.0000      6.2779     2.5535      2.5549
R=    0.5905
```

score was correlated only .13 with the total score on the Mosaic Comparisons Test--the test which was presumed to be most susceptible to distractions. This low correlation was judged to be insufficient as a basis for editing. Furthermore, examination of the mean test scores for schools in the top tenth percentile with respect to mean Distraction scores revealed no particular pattern of results.

1980 Sophomore and 1982 Senior data. In view of the results obtained from the examination of the 1972 and the 1980 senior data, we concluded that similar examination of the 1980 sophomore and 1982 senior test results was not necessary and, in addition, that examination of individual data would not be cost effective.

Summary. With two exceptions, the various analyses conducted revealed no clear evidence of irregularities. The exceptions are the relatively high mean scores and mean number of attempts on the Picture-Number and Mosaic Comparisons Tests. The high scores on the highly speeded Mosaic Comparisons Test could be attributable to the format change noted in the section on differences in administration, namely, the change from a separate answer sheet to answering within the test booklet next to the stem of the item. In the absence of other evidence, we will assume that this is the case.

The explanation of the relatively high scores on the Picture-Number Test is less clear. Of the several possibilities which have been mentioned, the likelihood that the 1980 administration was not as closely supervised as the 1972 administration and the fact that substantially larger numbers of students were involved in 1980 seem like the most relevant factors. In any case, in view of the differences, it is recommended that the Mosaic Comparisons Test and the Picture-Number Test not be used for cross-sectional comparisons between the 1972 and 1980 cohorts.

Item Analysis of the NLS and HS&B Tests

The traditional part of the psychometric analysis is divided into two sections. The first section is a discussion of the item analysis summary statistics by sex and ethnic group within cohort. The second section deals with the test reliabilities and standard errors of measurement by sex and ethnic groups within cohort. The item statistics and reliabilities are based on the weighted observations. The discussion of the item analysis results is necessarily a summary since any in-depth discussion of a battery of tests at the item level would add little reliable information beyond that provided by the psychometric analysis at the subtest and total test level. However, for readers who wish to examine how individual items performed for different sex and race groups, the complete tables for the NLS battery are presented in Appendices B1-B13. Appendices C1-C12 present the item statistics for HS&B high school senior test battery, and Appendices D1-D18 and E1-E18 present similar statistics for the 1980 sophomores and 1982 seniors cohort respectively.

This item analysis section will review item analysis results within cohort groups with respect to whether: (1) the tests are at the appropriate difficulty level, (2) the tests have sufficient ceilings so that "gains" can be a reasonable expectation, (3) whether the item biserials are positive within each group, and (4) the tests and possibly subtests have sufficient reliability to support reasonably accurate estimation of mean changes and changes in individual rank ordering over time.

The 1972 NLS Battery Item Statistics

The appendices show the proportion in each cohort group who responded correctly (P+). They also show item biserials and deltas. The item biserials give the correlation between the item response (right vs. wrong) and the total test score. The size of the biserial correlation indicates the extent to which a given item measures the same "things" as the remainder of the test. The item deltas are defined as $\Delta = 4\ \Phi^{-1}\ (1-P_i^+)\ +13$ where Φ^{-1} is the inverse normal transformation that transforms a probability value into a normal deviate with unit variance. Thus the distribution of item deltas will have a mean delta of 13 and standard deviation of 4. Summary statistics for each test are presented at the bottom of each table.

Inspection of appendices B1-B13 indicates that the 1972 NLS tests have mean scores (with the exception of letter groups) that vary from a low of 35% correct to almost 60% correct for the total population. In some subgroups the means are as low as 20% correct. Although gain scores are not a concern at this point, for the NLS seniors these results suggest there is sufficient ceiling on all the NLS test scores. We are arbitrarily defining a sufficient ceiling as a perfect score minus the group mean divided by the group standard deviation. This "ceiling index" should be equal to 1.5 or greater. Normal curve theory would, of course, suggest that optimal measurement would take place if there were "room" for two standard deviations above the mean. Psychometric theory, however, suggests that the test might best be somewhat easier to minimize the frequency of guessing.

The item biserials for the NLS battery are all relatively high. There is a consistent tendency for blacks and hispanics to have lower biserials for both vocabulary and mathematics. Although biserials are intended to be relatively insenstive to "split" (difficulty levels), if one plots biserials by difficutly levels, a "banana" shape is usually observed. That is, easy and hard items tend to have somewhat lower biserials. Since the vocabulary and mathematics items tend to be harder on average for blacks and hispanics, we would also expect somewhat lower biserials.

The reliabilities of the tests and subtests will be discussed separately in the following sections.

1980 Senior HS&B Battery Item Statistics

Similar to the NLS battery, mean scores for the total 1980 senior sample ranged from approximately 35% correct (visualization in three dimensions) to 47% for the mathematics test. There is little or no ceiling effect for the 1980 senior HS&B battery as defined by the "ceiling index." All measures had a ceiling index of 2.0 or greater. Item biserials were positive for all subgroups and in quite acceptable ranges; that is, most were above .40. Once again, blacks and hispanics had slightly lower biserials for the mathematics and vocabulary tests. As before, this differential probably reflects the differences in difficulty and/or restriction in range of the black and hispanic total scores.

One very interesting finding here is the difference in the number of items attempted between the 1972 seniors and the 1980 seniors; that is, the 1980 seniors consistently attempted more items than did the 1972 seniors. This is shown on the bottom of the item analysis tables in the appendices. The proportion of the total items that were not reached (the average number of items not reached divided by the total number of items in the test) was doubled on the average for 1972 seniors compared to 1980 seniors.

This finding is probably not the result of differences in administration conditions or "test wiseness," but simply the result of a mechanical change from answer sheets separate from the test booklet to answer sheets within the booklet. Because test score changes between 1972 and 1980 are confounded with this test format change, any comparison of means between 1972 and 1980 should attempt to correct for this change in the number of items attempted. Item response theory (IRT) methods are an appropriate procedure for correcting for this problem. This technique, and its relevance to this problem, are discussed in the section on IRT.

Item Statistics for the 1980 Sophomore and 1982 Senior Cohort

Appendices D1-D18 and E1-E18 present the item statistics for the 1980 sophomores and for the same group as seniors in 1982.

Since one of the primary purposes of this test battery was to measure changes in achievement over the last two years of high school, it is crucial that the measures be relatively free of ceiling effects. Inspection of the sophomore item statistics indicate, with the exception of the writing test, that the remaining tests all had ceiling indices of 2. or greater. The sophomore writing test had a ceiling index of 1.74. A summary of the ceiling indices (C.I.'s) are shown below:

Test	Sophomore (80)	Senior (82)
	C.I.	C.I.
Vocabulary	2.36	1.86
Reading	2.83	2.41
Math	2.66	2.28
Science	2.43	2.19
Writing	1.74	1.42
Civics	2.04	1.64

A comparison of sophomore and senior C.I.'s suggests that ceiling effects do not appear to be a constraining factor on the measurement of gain within the total sample. When considering the potential for gain in terms of C.I.'s, the largest proportional gains were in reading (15 percent) and vocabulary (21 percent). These percentages are based on the difference between the sophomore and senior C.I.'s divided by the sophomore C.I.

A comparison of the sophomore and senior biserials show an increase in the mean biserial when going from sophomore to senior status on all measures. This finding is consistent with the general increase in test reliability that occurs when one goes from sophomore to senior. This is discussed in detail in the test reliability section that follows.

One anomaly is the finding of two negative item biserials in the mathematics test for blacks and hispanics in the sophomore administration. One of these items (#28 in part 1, Table D8) changes to a positive biserial for senior blacks and hispanics, but the other item (#1 in part 2, Table D8) remains negative (Table D8). Inspection of the items suggests nothing in the content that would lead one to expect that performance on these items should have essentially no relationship with total score for blacks or hispanics. These two items are anomalous in another way. They are the only two (of 38) for which P+ is higher for blacks than for whites. This type of anomaly will have less effect on black and hispanic scores when IRT scaling is used. The next section on reliability examines both total test score reliability and reliability of item parcels where the parcels are based on common item content and/or operations.

Reliability of NLS and HSB Tests

Table 6 presents the reliabilities and standard errors of measurement for the 1972 NLS and HSB tests by selected subpopulations. The reliabilities were estimated by coefficient alpha (Lord & Novick, 1968). Coefficient alpha is an estimate of internal consistency among item responses and thus reflects the homogeneity of item content as well as precision of measurement. If a test is complex with respect to the things that it is measuring, coefficient alpha will probably be an underestimate of the precision of measurement characterizing that test. Precision of measurement, as defined here, can be thought of as an estimate of the stability of scores within a group of individuals when the test instrument is repeated within a minimal time period. Ideally, the retesting would be based on an equivalent (parallel) form so that memory would not inflate the estimates. Since a test-retest design using equivalent forms was not used, such estimates, although more desirable, were not available. Fortunately, factor analytic results of the tests (to be described in detail later), suggest that, for the most part, each test is characterized by a single dominant underlying factor. The presence of a single dominant factor suggests that coefficient alpha is a reasonable estimate of the precision of measurement attained by the NLS and HSB measures.

Reliabilities are population dependent in the sense that they reflect the homogeneity or variability of the trait within that population. Also, if a test is too hard (or too easy), there will be little variability in scores and thus the likelihood of a smaller reliability coefficient. The latter case reflects a fault in the measurement instrument, whereas the former (a less likely possibility) is not necessarily the fault of the instrument. Since it is not easy to separate these two sources of influence on the reliability, the standard error of measurement[1] (SEM) is also shown for each instance that a reliability coefficient is computed. The standard error of measurement provides an index of precision (small is better) that is relatively invariant with respect to population differences in variability on the assessed trait. Unlike the reliability coefficient, which is a standardized index, the SEM is measured in the original test score units and can be interpreted in the fashion of any standard error. That is, confidence bands can be formed about the observed score and probability statements can be made about such bands containing an individual's true score.

Inspection of the total column of Table 6 suggests that, considering the lengths of the tests, the reliabilities are respectable, with the possible exception of the civics test. It is also encouraging to note that for the total population the reliabilities increase and the SEM's become smaller when comparing the 1980 sophomores with the 1982 seniors.

One curious result is that the reliability of the HSB 1980 senior mathematics test is .85, whereas the reliability of the shorter NLS 1972 test is .86. This finding would appear to be consistent with the fact that the 1980 seniors on average attempted more items, but got fewer correct. The lower-than-expected reliability for the 1980 seniors could reflect an increased tendency to guess, and/or the fact that the longer test is less homogeneous.

---

[1] SEM = $\sigma_x \sqrt{1 - r_{xx}}$ where r_{xx} is the reliability of the test and σ_x is the standard deviation of the test.

Table

RELIABILITY OF T
(FORMULA

	TOTAL		MALE		FEMALE		WHITE		BLACK		H
	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	AL
NLS 1972:											
VOCABULARY	.78	1.96	.78	1.96	.78	1.95	.76	1.95	.63	1.95	.
READING	.79	2.32	.79	2.32	.79	2.31	.77	2.31	.73	2.32	.
MATH	.86	2.74	.87	2.68	.85	2.78	.85	2.70	.77	2.86	.
HSB 1980 SENIORS:											
VOCABULARY	.82	2.75	.83	2.71	.82	2.76	.82	2.74	.71	2.76	.
READING	.79	2.36	.80	2.36	.78	2.35	.78	2.35	.73	2.35	.
MATH	.85	3.16	.86	3.11	.83	3.20	.85	3.13	.77	3.28	.
HSB 1980 SOPHOMORES:											
VOCABULARY	.80	2.36	.80	2.33	.81	2.37	.79	2.31	.72	2.46	.
READING	.77	2.28	.77	2.29	.76	2.27	.76	2.28	.66	2.23	.
MATH	.87	3.52	.88	3.51	.85	3.53	.87	3.51	.76	3.51	.
SCIENCE	.74	2.36	.76	2.32	.71	2.40	.69	2.33	.64	2.40	.
WRITING	.80	2.30	.79	2.35	.78	2.25	.79	2.26	.71	2.40	.
CIVICS	.52	1.85	.54	1.86	.49	1.84	.51	1.83	.40	1.89	.
HSB 1982 SENIORS:											
VOCABULARY	.84	2.26	.84	2.24	.85	2.27	.82	2.19	.79	2.43	.
READING	.80	2.25	.81	2.25	.80	2.24	.80	2.24	.70	2.23	.
MATH	.90	3.44	.91	3.42	.89	3.45	.90	3.40	.81	3.48	.
SCIENCE	.76	2.31	.78	2.26	.74	2.35	.73	2.27	.67	2.38	.
WRITING	.83	2.17	.82	2.25	.81	2.09	.81	2.10	.76	2.35	.
CIVICS	.60	1.77	.62	1.78	.58	1.76	.59	1.73	.53	1.87	.

6

TOTAL TEST SCORES
SCORING)

ISPANIC		WH MALE		WH FEMALE		BL MALE		BL FEMALE		H MALE		H FEMALE	
LPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
.62	2.01	.76	1.96	.76	1.94	.63	1.93	.63	1.96	.66	1.97	.59	2.03
.73	2.37	.77	2.32	.76	2.30	.76	2.31	.70	2.32	.75	2.37	.72	2.35
.80	2.90	.86	2.64	.84	2.76	.79	2.85	.75	2.87	.81	2.89	.78	2.90
.73	2.81	.83	2.70	.81	2.75	.74	2.76	.69	2.75	.74	2.80	.73	2.81
.73	2.40	.79	2.36	.77	2.34	.75	2.37	.71	2.34	.74	2.40	.71	2.39
82	3.28	.86	3.07	.83	3.17	.81	3.27	.73	3.28	.84	3.25	.78	3.30
73	2.47	.78	2.27	.79	2.33	.73	2.44	.70	2.46	.72	2.45	.74	2.48
64	2.30	.76	2.28	.76	2.27	.68	2.24	.64	2.23	.66	2.31	.63	2.28
79	3.57	.88	3.48	.85	3.52	.78	3.50	.74	3.51	.80	3.58	.76	3.55
68	2.44	.72	2.28	.66	2.37	.68	2.38	.58	2.41	.71	2.41	.63	2.46
73	2.43	.79	2.33	.75	2.18	.68	2.39	.71	2.40	.71	2.43	.73	2.42
45	1.90	.54	1.84	.47	1.82	.39	1.89	.40	1.89	.46	1.90	.45	1.88
80	2.42	.82	2.17	.83	2.20	.80	2.40	.77	2.45	.80	2.40	.80	2.44
72	2.29	.80	2.23	.79	2.23	.71	2.25	.69	2.22	.72	2.30	.72	2.27
84	3.52	.91	3.37	.88	3.42	.82	3.48	.80	3.48	.85	3.53	.82	3.50
72	2.40	.75	2.21	.70	2.32	.73	2.34	.59	2.40	.74	2.37	.69	2.42
80	2.34	.82	2.20	.78	2.00	.74	2.37	.76	2.33	.78	2.37	.80	2.30
55	1.87	.61	1.74	.56	1.72	.55	1.86	.50	1.87	.54	1.88	.55	1.85

Although the reliabilities are consistently lower for blacks and hispanics when compared with whites, the SEM's are only trivially larger (for blacks and hispanics), suggesting that much of the reliability difference may be due to population differences in variability. That is, there is a lower population variability for minority groups than for whites.

In sum, it would seem safe to conclude that the tests are all sufficiently reliable to assess mean changes and, with the possible exception of the civics test, can be used to assess change in the rank ordering of individual scores. The relative equality of the SEM's across subpopulations suggests that the tests have similar precisions for whites, blacks, and hispanics.

Reliabilities of the Subtests

Test development experts at ETS were asked to look at item content and difficulty to form subtests based on groupings of items showing common content or processes. One purpose of the exercise was to form reliable "marker" variables for potential factors that could be subsequently verified empirically with confirmatory factor analyses. In addition, these parcels generated scores with continuous scales that, in turn, were more likely to be normally distributed than, say, individual items. If the empirical results of the confirmatory factor analysis support the rational clustering of items in specific achievement areas such as science and writing, there is reason to believe that findings of differential gains by subject matter area would be a a distinct possibility. The NLS 1972 and the parallel senior cohort in 1980 "shared" reading items and a common core of vocabulary and mathematics items. The reading test was partitioned into five separate subtests based on five separate reading passages. The mathematics test and vocabulary test were each split into odd-even halves in order to provide two "pure" indicators of a mathematics and vocabulary factor. The HSB sophomore-senior cohort had a much "richer" test battery, and the test development specialists were able to classify the items across a number of content dimensions. The tests were partitioned into the item parcels in the following way:

Number of Items in Each Subtest For NLS 1972 and HS&B 1980 Senior Cohort

Subtest	1972	1980
VOCABULARY ODD	8	14
VOCABULARY EVEN	7	13
READING PASSAGE 1	5	5
READING PASSAGE 2	4	4
READING PASSAGE 3	4	4
READING PASSAGE 4	4	4
READING PASSAGE 5	3	3
MATHEMATICS ODD	13	16
MATHEMATICS EVEN	12	16

Number of Items in Subtests for HSB Sophomore Cohort

VOCABULARY ODD	11
VOCABULARY EVEN	10
READING PASSAGE 1	4
READING PASSAGE 2	4
READING PASSAGE 3	4
READING PASSAGE 4	4
READING PASSAGE 5	3
MATHEMATICS - ALGEBRA	12
MATHEMATICS - ARITHMETIC	18
MATHEMATICS - GEOMETRY	8
SCIENCE - BIOLOGY	6
SCIENCE - CHEMISTRY	3
SCIENCE - PHYSICS	3
SCIENCE - SES	4
SCIENCE - METHODOLOGY	4
WRITING - PUNCTUATION	6
WRITING - STYLE	11
CIVICS ODD	5
CIVICS EVEN	5

Tables 7-10 present estimates of the reliabilities and SEM's for subtests by cohort population. Each table deals with a separate cohort population and presents reliabilities and SEM's by ethnic and sex groups within a cohort. Column means and standard deviations are presented at the bottom of each table column. These summary statistics allow for gross comparisons of reliabilities and SEM's by ethnic and sex subpopulations (columns). As with the total test scores the, reliabilities, of course, vary by subtest length and, to a lesser extent, by subpopulation. However, a comparison of the SEM's for a given subtest by subpopulation suggests that the subtests, like the total tests, are relatively invariant with respect to precision of measurement across populations within the same cohort.

Direct cross-sectional comparisons of reliability changes for subpopulations from 1972 to 1980 (Tables 7 and 8) are not appropriate (with the exception of the reading subtest), since the lengths of the tests are different. However, classical test theory suggests that the reliability of the math test should have increased from 1972 to 1980, since the 1980 test was lengthened by seven items. Part of the problem may result from the fact that the additional items tended to depart from the general arithmetic mold that characterized the original set administered in 1972. A contributing difficulty is the fact that the 1980 seniors tended to attempt more items than did the 1972 seniors and, as a result, were possibly more prone to guessing. At first glance it appears that, for most of the reading passages, the reliabilities decrease from 1972 to 1980 for blacks and hispanics, but these apparent changes in reliabilities are not always consistent with parallel changes in SEM's.

Table

NLS
RELIABILITY
(RIGHTS-ON

	TOTAL		MALE		FEMALE		WHITE		BLACK	
	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
VOCABULARY:										
ODD ITEMS	.66	1.13	.66	1.13	.67	1.12	.63	1.12	.51	1.16
EVEN ITEMS	.63	1.15	.63	1.15	.62	1.14	.62	1.16	.43	1.10
READING:										
PASSAGE 1	.53	.84	.55	.85	.50	.82	.49	.81	.54	.94
PASSAGE 2	.52	.85	.51	.85	.53	.85	.48	.85	.45	.86
PASSAGE 3	.47	.85	.49	.85	.46	.84	.43	.84	.44	.87
PASSAGE 4	.42	.86	.40	.86	.44	.86	.40	.87	.38	.75
PASSAGE 5	.54	.71	.57	.70	.51	.72	.52	.72	.39	.65
MATH:										
ODD ITEMS	.77	1.49	.78	1.47	.75	1.52	.75	1.47	.63	1.59
EVEN ITEMS	.75	1.45	.76	1.41	.74	1.49	.73	1.44	.64	1.51
MEAN	.59	1.04	.60	1.03	.58	1.04	.56	1.03	.49	1.05
S.D.	.11	.27	.12	.26	.11	.28	.12	.26	.09	.31

7

1972
OF SUBSCORES
LY SCORING)

HISPANIC		WH MALE		WH FEMALE		BL MALE		BL FEMALE		H MALE		H FEMALE	
LPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
.55	1.19	.63	1.13	.64	1.11	.50	1.15	.50	1.16	.62	1.15	.46	1.22
.41	1.13	.62	1.16	.61	1.15	.46	1.08	.40	1.11	.43	1.12	.37	1.14
.53	.95	.51	.83	.47	.79	.60	.94	.46	.95	.60	.93	.46	.96
.52	.85	.47	.84	.49	.85	.46	.85	.46	.86	.58	.83	.46	.86
.44	.87	.44	.84	.41	.84	.48	.86	.42	.87	.43	.87	.46	.86
.28	.79	.37	.87	.42	.87	.40	.75	.36	.76	.40	.78	.11	.79
.39	.70	.55	.71	.49	.73	.46	.63	.33	.66	.42	.70	.35	.69
.67	1.60	.76	1.44	.73	1.50	.66	1.59	.60	1.59	.69	1.59	.65	1.60
.67	1.52	.74	1.40	.72	1.48	.67	1.49	.59	1.52	.68	1.52	.64	1.53
.49	1.07	.57	1.02	.55	1.03	.52	1.04	.46	1.05	.54	1.05	.44	1.07
.12	.30	.12	.25	.12	.28	.09	.31	.09	.31	.11	.30	.15	.31

Tabl

HSB 1980
RELIABILITY
(RIGHTS-ON

	TOTAL		MALE		FEMALE		WHITE		BLACK	
	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
VOCABULARY:										
ODD ITEMS	.69	1.60	.70	1.57	.67	1.61	.67	1.59	.55	1.63
EVEN ITEMS	.71	1.57	.72	1.56	.70	1.57	.71	1.57	.56	1.54
READING:										
PASSAGE 1	.56	.87	.57	.88	.53	.85	.53	.85	.58	.93
PASSAGE 2	.53	.86	.54	.85	.52	.86	.51	.86	.45	.85
PASSAGE 3	.47	.86	.49	.85	.45	.85	.45	.85	.41	.87
PASSAGE 4	.40	.84	.39	.85	.41	.84	.39	.86	.35	.74
PASSAGE 5	.44	.75	.46	.74	.40	.75	.43	.75	.31	.73
MATH:										
ODD ITEMS	.73	1.71	.75	1.69	.70	1.73	.72	1.70	.60	1.78
EVEN ITEMS	.76	1.67	.78	1.64	.74	1.69	.75	1.65	.67	1.74
MEAN	.59	1.19	.60	1.18	.57	1.20	.57	1.19	.50	1.20
S.D.	.13	.40	.13	.39	.13	.41	.13	.40	.12	.43

e 8

SENIORS
OF SUBSCORES
LY SCORING)

HISPANIC		WH MALE		WH FEMALE		BL MALE		BL FEMALE		H MALE		H FEMALE	
LPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
.59	1.65	.70	1.56	.66	1.59	.59	1.62	.52	1.63	.59	1.63	.59	1.64
.57	1.58	.72	1.56	.70	1.58	.60	1.55	.55	1.53	.58	1.58	.57	1.58
.56	.95	.54	.86	.50	.83	.59	.93	.55	.93	.60	.95	.50	.95
.46	.86	.52	.84	.49	.86	.46	.87	.45	.84	.48	.86	.47	.86
.41	.88	.48	.85	.42	.85	.46	.87	.38	.87	.42	.88	.42	.87
.23	.78	.39	.86	.39	.86	.33	.77	.37	.73	.22	.78	.21	.79
.30	.75	.45	.74	.40	.76	.37	.73	.25	.74	.33	.76	.20	.76
.66	1.78	.75	1.66	.69	1.72	.63	1.79	.55	1.78	.70	1.76	.60	1.79
.72	1.73	.76	1.62	.73	1.68	.73	1.72	.61	1.75	.74	1.72	.69	1.75
.50	1.22	.59	1.17	.55	1.19	.53	1.21	.47	1.20	.52	1.21	.47	1.22
.15	.42	.13	.38	.13	.41	.12	.42	.11	.43	.16	.42	.16	.43

For the sophomore-senior cohort (Tables 9 and 10), the reliabilities and SEM's show the same pattern of improvement as did the total scores when going from sophomore to senior years. The reliabilities tend to be generally low for the geometry (8 items) and chemistry (3 items) subtests for all sophomore subpopulations, but especially so for blacks and hispanics. Since there is a proportionally greater improvement in these reliabilities for blacks and hispanics as one goes from sophomore to senior status, one can only suspect that blacks and hispanics are less likely than whites to have already had the advantage of exposure to the geometry and chemistry content at the sophomore level. An even more surprising finding is that the reliability of the biology parcel is relatively low at the sophomore level and did not improve for seniors. It may be that the time lapse between taking biology and achieving senior status led to considerable forgetting and thus more guessing by seniors.

In summary, there was little change in reliability or standard errors of measurement (SEM's) on comparable subtest measures (e.g., reading passages) when NLS 1972 seniors and 1980 HSB seniors were compared. There is, however, with the exception of the biology parcel, a consistent gain in reliability of the subtest scores as one goes from sophomore to senior year. There is also a proportionately greater gain in the reliabilities for those subtests (especially for minorities) where formal exposure to test content would be unlikely at the sophomore level. The initial low reliability of the biology parcel, and its lack of gain in reliability with senior status, suggests that one would not consider estimating individual gains in the content area defined by this parcel. In general, the reliability of the subtest parcels is not sufficient to justify their use in measuring gains at the individual level.

It is possible that science score gains might be computed two ways--one with the biology items included and one with them excluded.

Tabl

HSB 1980
RELIABILITY
(RIGHTS-O

	TOTAL		MALE		FEMALE		WHITE		BLACK	
	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
VOCABULARY:										
ODD ITEMS	.69	1.40	.69	1.40	.69	1.39	.68	1.37	.57	1.45
EVEN ITEMS	.65	1.30	.65	1.28	.65	1.32	.62	1.27	.55	1.36
READING:										
PASSAGE 1	.44	.77	.47	.76	.41	.77	.41	.73	.39	.86
PASSAGE 2	.38	.87	.35	.88	.40	.85	.38	.87	.28	.84
PASSAGE 3	.44	.87	.45	.88	.44	.86	.44	.86	.32	.87
PASSAGE 4	.50	.85	.51	.84	.50	.85	.50	.86	.42	.80
PASSAGE 5	.37	.72	.40	.72	.35	.71	.38	.73	.17	.64
MATH:										
ALGEBRA	.70	1.46	.73	1.46	.66	1.47	.68	1.45	.57	1.48
ARITHMETIC	.78	1.86	.80	1.85	.76	1.87	.78	1.85	.63	1.87
GEOMETRY	.52	1.20	.56	1.20	.46	1.19	.53	1.20	.27	1.14
SCIENCE:										
BIOLOGY	.32	1.05	.33	1.04	.31	1.06	.25	1.04	.25	1.08
CHEMISTRY	.26	.78	.32	.77	.17	.78	.28	.78	.07	.76
PHYSICS	.52	.70	.52	.67	.48	.73	.43	.68	.41	.73
EARTH SCIENCE	.38	.77	.42	.74	.32	.80	.34	.74	.33	.85
SCI. METHOD	.46	.87	.49	.87	.44	.87	.44	.87	.34	.85
WRITING:										
PUNCTUATION	.62	1.01	.60	1.04	.59	.98	.60	.99	.56	1.06
STYLE	.74	1.42	.73	1.45	.72	1.39	.72	1.39	.64	1.49
CIVICS:										
ODD ITEMS	.40	.94	.42	.94	.37	.94	.39	.92	.27	.99
EVEN ITEMS	.29	1.04	.33	1.04	.26	1.03	.29	1.04	.17	1.04
MEAN	.50	1.05	.51	1.04	.47	1.05	.48	1.03	.38	1.06
S.D.	.15	.31	.15	.31	.16	.31	.15	.30	.16	.32

e 9

SOPHOMORES
OF SUBSCORES
LY SCORING)

HISPANIC		WH MALE		WH FEMALE		BL MALE		BL FEMALE		H MALE		H FEMALE	
LPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
.60	1.46	.68	1.37	.68	1.36	.57	1.44	.56	1.45	.58	1.45	.62	1.46
.55	1.37	.60	1.24	.62	1.30	.57	1.36	.52	1.36	.54	1.36	.55	1.37
.42	.86	.44	.72	.38	.74	.43	.84	.35	.86	.47	.84	.35	.87
.24	.84	.35	.88	.40	.86	.29	.85	.26	.82	.23	.85	.24	.81
.29	.90	.45	.87	.43	.85	.37	.86	.28	.87	.28	.91	.30	.88
.34	.83	.50	.85	.49	.86	.45	.79	.39	.81	.33	.83	.35	.82
.22	.68	.41	.73	.35	.73	.16	.65	.19	.63	.23	.69	.20	.68
.61	1.49	.71	1.45	.64	1.45	.62	1.47	.53	1.48	.64	1.49	.57	1.49
.67	1.90	.80	1.83	.75	1.86	.65	1.86	.62	1.88	.68	1.90	.67	1.88
.27	1.18	.57	1.20	.47	1.20	.29	1.15	.25	1.13	.32	1.19	.19	1.17
.31	1.08	.27	1.02	.24	1.05	.24	1.07	.24	1.09	.32	1.06	.29	1.10
.12	.77	.34	.78	.19	.79	.11	.76	.04	.76	.14	.77	.10	.77
.47	.75	.40	.64	.42	.72	.47	.74	.30	.73	.49	.74	.38	.76
.32	.85	.38	.71	.28	.78	.35	.83	.29	.87	.40	.82	.20	.88
.37	.88	.47	.86	.41	.87	.38	.85	.30	.85	.38	.88	.35	.87
.55	1.07	.60	1.03	.55	.95	.53	1.06	.56	1.05	.51	1.08	.57	1.05
.66	1.49	.72	1.43	.69	1.35	.62	1.47	.63	1.50	.65	1.48	.65	1.50
.36	.98	.42	.92	.35	.92	.24	1.00	.29	.99	.36	.99	.36	.98
.23	1.04	.33	1.04	.25	1.03	.18	1.05	.16	1.04	.23	1.04	.21	1.03
.40	1.07	.50	1.03	.45	1.03	.40	1.06	.36	1.06	.41	1.07	.38	1.07
.16	.32	.15	.31	.16	.30	.16	.32	.16	.32	.16	.32	.17	.32

Table 1

HSB 1982
RELIABILITY OF
(RIGHTS-ONLY

	TOTAL		MALE		FEMALE		WHITE		BLACK	
	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
VOCABULARY:										
ODD ITEMS	.75	1.34	.74	1.34	.75	1.33	.73	1.30	.68	1.42
EVEN ITEMS	.72	1.25	.72	1.21	.72	1.27	.68	1.20	.63	1.36
READING:										
PASSAGE 1	.45	.74	.50	.72	.39	.75	.42	.69	.40	.84
PASSAGE 2	.47	.86	.44	.86	.48	.85	.48	.85	.29	.85
PASSAGE 3	.48	.85	.49	.86	.48	.84	.48	.84	.37	.86
PASSAGE 4	.55	.84	.55	.84	.56	.84	.54	.85	.48	.81
PASSAGE 5	.46	.72	.49	.72	.44	.72	.46	.73	.30	.64
MATH:										
ALGEBRA	.74	1.44	.76	1.43	.72	1.44	.73	1.42	.65	1.47
ARITHMETIC	.83	1.81	.84	1.79	.81	1.82	.83	1.79	.72	1.85
GEOMETRY	.61	1.17	.64	1.17	.57	1.16	.62	1.17	.38	1.13
SCIENCE:										
BIOLOGY	.32	1.02	.33	1.01	.31	1.03	.24	1.01	.33	1.05
CHEMISTRY	.36	.76	.43	.75	.26	.77	.37	.77	.16	.74
PHYSICS	.56	.67	.57	.62	.52	.71	.47	.64	.49	.73
EARTH SCIENCE	.41	.76	.44	.73	.36	.79	.36	.74	.34	.83
SCI. METHOD	.51	.85	.54	.84	.47	.86	.47	.84	.38	.85
WRITING:										
PUNCTUATION	.64	.97	.62	1.01	.61	.92	.62	.94	.56	1.05
STYLE	.78	1.33	.78	1.38	.76	1.29	.76	1.29	.72	1.46
CIVICS:										
ODD ITEMS	.43	.90	.44	.90	.41	.89	.40	.87	.34	.99
EVEN ITEMS	.42	1.00	.45	1.00	.40	.99	.41	.99	.33	1.03
MEAN	.55	1.01	.57	1.01	.53	1.02	.53	1.00	.45	1.05
S.D.	.15	.29	.14	.30	.16	.29	.16	.29	.16	.31

10

ENIORS
F SUBSCORES
Y SCORING)

ESPANIC		WH MALE		WH FEMALE		BL MALE		BL FEMALE		H MALE		H FEMALE	
HA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE	ALPHA	SE
9	1.43	.72	1.31	.72	1.29	.69	1.41	.67	1.43	.68	1.43	.69	1.43
6	1.33	.68	1.17	.69	1.23	.66	1.33	.58	1.38	.68	1.30	.63	1.36
1	.84	.49	.67	.35	.70	.47	.82	.33	.86	.45	.83	.36	.86
4	.85	.46	.86	.49	.85	.24	.87	.32	.83	.30	.86	.38	.83
4	.89	.49	.85	.46	.83	.42	.87	.34	.85	.35	.89	.34	.88
5	.83	.53	.85	.54	.85	.49	.82	.46	.81	.45	.83	.45	.83
9	.69	.48	.73	.43	.73	.34	.65	.26	.63	.31	.69	.27	.69
6	1.49	.76	1.41	.70	1.43	.65	1.47	.64	1.47	.68	1.50	.64	1.47
4	1.87	.84	1.76	.81	1.80	.73	1.85	.70	1.85	.75	1.86	.72	1.87
0	1.17	.64	1.17	.58	1.16	.44	1.14	.30	1.12	.44	1.18	.34	1.16
9	1.06	.26	1.00	.22	1.01	.31	1.03	.33	1.06	.32	1.05	.26	1.08
3	.75	.44	.75	.27	.78	.17	.74	.15	.75	.28	.74	.15	.76
1	.74	.44	.58	.44	.69	.54	.73	.38	.74	.53	.72	.44	.76
9	.82	.38	.70	.32	.77	.41	.81	.25	.85	.42	.81	.35	.84
5	.86	.52	.83	.42	.86	.42	.85	.35	.85	.45	.86	.45	.85
7	1.05	.62	.98	.56	.88	.52	1.08	.57	1.02	.54	1.07	.57	1.02
4	1.44	.77	1.34	.72	1.23	.71	1.45	.71	1.46	.72	1.46	.75	1.43
9	.97	.42	.87	.38	.86	.38	.98	.31	.99	.40	.97	.36	.96
6	1.03	.44	.99	.38	.98	.37	1.03	.31	1.03	.35	1.03	.37	1.02
7	1.06	.55	.99	.50	1.00	.47	1.05	.42	1.05	.48	1.06	.45	1.06
6	.31	.15	.29	.17	.28	.16	.31	.17	.31	.15	.31	.17	.31

Factor Structure of the Tests

After investigating the internal consistency of the tests and their subtests, it is appropriate to inquire about what the tests are and are not measuring; and whether what is measured is the same across cohort groups and selected subpopulations within cohorts. Logic might dictate that one first define what the tests measure and then evaluate their precision. The order is reversed here because (1) the reliability estimates are going to be needed for the interpretation of the factor analytic results, and (2) we have chosen to "mark" our potential factors with reliable parcels or clusters of items that, in theory, share common content. Independent estimates of coefficient alpha provide some empirical evidence for any subsequent interpretation of these subtests as separate homogeneous entities. With the exception of the biology parcel, the remaining parcels have reliabilities that are in the "ball park" for the number of items included in the parcel. This finding suggests that each of the parcels is relatively internally consistent and, as a consequence, can be assumed to be a measure of a reasonably homogeneous content area. Content areas within a particular discipline, e.g., the content parcels within the science area, can then be hypothesized as measures or indicators of a science construct or factor in a confirmatory factor analytic solution.

Past empirical and theoretical studies suggest that any one of three possible factor models might fit the present achievement data. The simplest model would be a single underlying achievement factor that would adequately explain the reliable variance within each parcel. If such a model was consistent with the data, one would have to conclude that all parcels were measures of a general knowledge factor. Another model might be a simple two-factor model where each parcel is a different combination of, say, a verbal and quantitative factor. This model is consistent with the usual findings, where verbal and quantitative measures are factor analyzed, and is also similar to the Heyns and Hilton results with HS&B test data. A third alternative would be a multiple-factor model where each content area, e.g., science, reading, mathematics, etc., define separate but correlated achievement factors. A theoretical model consistent with such a result would be a general knowledge factor that would cut across each discipline area and, in addition, have separate group factors for each discipline area. The general factor would generate or underlie the correlations among the group factors.

All factors analysis computations were based on the weighted data. Two variants of the single-factor model are estimated first. Table 11 presents both the percentage of common variance, and the percentage of reliable variance explained by a single-factor model, and then by the two-factor model described above in Model 2. The first column labeled common factor solution shows the percent of common variance explained by the first principal axes of the correlation matrix with commonalities on the main diagonal. The commonalities were estimated using the multiple correlation squared. Inspection of Table 11 indicates that the first factor explains from 97 to 100 percent of the common variance, depending on cohort group. Using any of the traditional criteria for determining the number of factors, one would be led to believe that all parcels were simply different methods of measuring a single general knowledge factor. Although Anastasi (1982) argues that the general knowledge factor increases in size with increases in population heterogeneity, there appears to be more at work here than population heterogeneity.

Table 11

Percent of Variance Explained by Selected Factor Analysis Solutions

POPULATIONS	COMMON FACTOR SOLUTION[a]	PSYCHOMETRIC SOLUTION[b]	
	ONE FACTOR	ONE FACTOR SOLUTION	TWO FACTOR SOLUTION
1972 SENIORS	100%	77%	88%
1980 SENIORS	100%	79%	90%
1980 SOPHOMORES	97%	81%	86%
1982 SENIORS	98%	83%	87%

[a] Principal axes with R^2 on main diagonal

[b] Maximum likelihood solution showing percent of reliable variance

The traditional factor analytic approach to explaining *common* achievement test variance, rather than *reliable* test variance, seems to be partially responsible for this unexpected factor space degeneration. The columns under the label "psychometric solution" show the percent of *reliable* variance explained by a maximum likelihood solution (MLH) for the single-factor (Model 1) and the two-factor (Model 2) models. The situation improves considerably with a single general factor explaining from 77 to 83% of the *reliable* variance depending on the cohort. The two-factor model explains from 87 to 90% of the *reliable* variance. These percentages of reliable variance are probably slightly overestimated, since coefficient alpha is generally a lower bound estimate of the test-retest reliability. The results of this partitioning of the reliable variance suggest that the two-factor model would provide a good starting point for the confirmatory factor analysis.

1972-1980 Cross-sectional Comparison of Factor Patterns

Table 12 presents the factor loading pattern coefficients for the two-factor solution for the NLS 1972 and HS&B 1980 seniors. The factor loadings for HS&B 1980 seniors are shown in parenthesis (). This is a maximum likelihood confirmatory factor analytic solution with parameters estimated by the LISREL VI computer program (Joreskog & Sorbom, 1983). Consistent with the factor analytic results in the literature, a verbal and a math factor were defined by the vocabulary and math subtests. Inspection of the factor loadings in Table 12 indicates that the two vocabulary parcels and the two math parcels were constrained to have zero loadings on the math and vocabulary factors respectively. These constraints served two purposes. First, they defined a relatively "pure" verbal factor and a "pure" math factor. Second, they made the model identified which, in turn, allowed LISREL to find a unique solution

Table 12

Two Factor Total Sample Cross-Sectional Solution for 1972 and 1980 SENIORS (   )

VARIABLE	FACTOR 1[a]		FACTOR 2[a]		INTERNAL CONSISTENCY RELIABILITIES		RELIABLE UNEXPLAINED VARIANCES	
VOCABULARY ODD	82	(84)	0	(0)	66	(69)	1	(0)
VOCABULARY EVEN	76	(83)	0	(0)	63	(71)	5	(2)
READING PASSAGE 1	44	(43)	21	(24)	53	(56)	17	(17)
READING PASSAGE 2	43	(41)	28	(30)	52	(53)	9	(9)
READING PASSAGE 3	49	(45)	18	(23)	47	(47)	9	(7)
READING PASSAGE 4	50	(51)	9	(7)	42	(40)	10	(9)
READING PASSAGE 5	43	(39)	23	(18)	54	(44)	17	(15)
MATHEMATICS ODD	0	(0)	89	(85)	77	(73)	0	(1)
MATHEMATICS EVEN	0	(0)	88	(88)	75	(76)	0	(0)

RMS = .026 (.027)   Percentage of Reliable Variance 87.8 (90.0)

GFI = 978 (976) $r_{F_1F_2}$ = .69 (.72)

[a] Decimal points have been omitted.

to the maximum likelihood equations. The reading parcels were left "free" to load on either the verbal or math factor, under the assumption that some of the reading passages with heavy scientific emphasis might also load on the math factor. In fact, there is some tendency to do just that as indicated by the second passages and, to a lesser extent, the fifth passage. Both passages had a scientific theme.

The internal consistency reliability estimates are the coefficient alphas discussed earlier. The last two columns are the differences between the amount of a variable's variance that can be explained by the underlying verbal and math factors and that variable's reliability. For example, 66% of the observed variance in the odd vocabulary items is true or systematic variance. Of the 66%, all but 1% was explained by the verbal factor. Similarly, in 1972, 53% of the first reading passage variance was true or reliable variance. Only 36% (53-17) of this reading passage's variance can be explained by the verbal and math factor. Thus, 32 percent of the first reading passage's reliable variance (17/53) was not explained by the two-factor model. The two variables that seem to have reliable variance that is not explained by the 2-factor model are the first and fifth reading passage. This result is true for both the 1972 and 1980 seniors. The first reading passage has a black literature orientation, whereas, the fifth passage has a scientific theme.

The similarities in the factor structure for both Senior classes are much more striking than are any of the differences. In general, the pattern of loadings is almost identical with slight exceptions where the reliabilities might have differed from one cohort to another.

The factor intercorrelations are about the size that one has come to expect between verbal and math factors.

It should be noted that the factor intercorrelation can be considered to be corrected for attenuation. That is, the correlation between the verbal factor and the math factor is not attenuated by measurement errors.

Although the LISREL program produces standard errors and χ^2's for testing the overall model fit, they will not be reported here, since we have chosen to standardize the variables and deal with the correlation matrix for ease of interpretation. The χ^2 tests and standard errors associated with standardized variables do not have their usual meaning. To insure that one wouldn't come to substantively differing conclusions if one factored the variance-covariance matrices (rather than correlations), parallel analyses were run on the variance-covariance matrices.

In lieu of the χ^2 measure of the overall goodness of fit of the model, we provide the root mean square residual (RMS) which is the average correlation among the residuals after fitting the model. The RMS's of .026 and .027 for 1972 and 1980 are sufficiently low to suggest a good fit. LISREL provides one other measure of goodness of fit that, like the RMS, is independent of sample size and that is the GFI. The GFI varies between 0 and 1, where one (1) is a perfect fit. The very high GFI's of .978 and .976 suggest very good fits for both the 1972 and 1980 seniors.

These results are very similar to the Beyna and Hilton (1982) results, except that they also included the Picture Number and Mosaic Comparisons. They did not, however, deal with separate reading passages. They found that verbal, math and a third, unnamed, factor seemed to be sufficient to explain the intercorrelations among the tests.

The possibility of a model three fit was investigated by examining the correlations among the reading passage residuals to see if there was any possibility of defining a separate reading factor. No systematic pattern of residuals suggesting a common reading factor was found. Evidently, any part of the reliable variance in the reading passages that was not explained by the verbal and math factor was probably due to the content specific nature of the passage.

Comparisons of Factor Patterns for Sophomore and Senior Cohorts

Table 13 presents a two-factor (Model 1I) solution for the sophomore subtest scores and then again for the same group as seniors. The senior factor loadings are shown in parethenses. The same math-verbal two-factor pattern of constraints on the factor loadings was used for both sophomores and seniors. Since there are now 19 observed variables, it was decided to increase the number of zero constraints to overidentify the two-factor model. With this in mind, the reading passages' loadings were constrained to zero on the "pure" math factor. That is, they served as additional marker variables that have been constrained by the model to be zero are underlined. Thus, the vocabulary and reading passages were the "marker" variables for the "pure" verbal factor and the three math subtests served as markers for the math factor. The science, writing, and civics subtests were free to load at will.

Inspection of the loadings suggests that even with 19 obseved variables measuring 6 potential achievement areas (vocabulary, reading, math, science, writing and civics), two factors seem to explain virtually all of the reliable variance. That is, the verbal and math factors explain 85.8% of the reliable variance for the sophomores and 87.0% of the reliable variance for the seniors. With the exception of the writing subtests and the physics subtest, the remaining subtests' reliable variances seem to be explained by a linear function of the verbal and math factors. These conclusions apply equally to both the sophomore and senior results. It is also interesting to note that physics and chemistry tend to have complex loadings, i.e., load on both the verbal and math factors, whereas the remaining science subtests load primarly

Table 13

Two Factor Maximum Likelihood Solution for HS&B Sophomores and Seniors (   )

VARIABLE	FACTOR 1[a]	FACTOR 2[a]	INTERNAL CONSISTENCY RELIABILITY	RELIABLE UNEXPLAINED VARIANCES
VOCABULARY ODD	77 (81)	0 (0)	69 (75)	9 (10)
VOCABULARY EVEN	76 (80)	0 (0)	65 (72)	7 (7)
READING PASSAGE 1	61 (64)	0 (0)	44 (45)	7 (5)
READING PASSAGE 2	57 (63)	0 (0)	38 (47)	5 (7)
READING PASSAGE 3	64 (67)	0 (0)	44 (48)	3 (3)
READING PASSAGE 4	67 (70)	0 (0)	50 (56)	6 (6)
READING PASSAGE 5	53 (60)	0 (0)	37 (46)	8 (10)
MATHEMATICS-ALGEBRA	0 (0)	84 (86)	70 (74)	0 (0)
MATHEMATICS-ARITHMETIC	0 (0)	87 (89)	77 (83)	1 (3)
MATHEMATICS-GEOMETRY	0 (0)	69 (75)	51 (61)	3 (5)
SCIENCE-BIOLOGY	47 (51)	8 (5)	32 (32)	3 (2)
SCIENCE-CHEMISTRY	30 (29)	17 (26)	26 (36)	6 (8)
SCIENCE-PHYSICS	30 (33)	34 (32)	52 (56)	15 (17)
SCIENCE-EARTH SCIENCE	40 (42)	13 (15)	38 (41)	11 (11)
SCIENCE-METHODOLOGY	60 (68)	10 (5)	46 (51)	0 (0)
WRITING-PUNCTUATION	35 (46)	30 (21)	62 (64)	23 (21)
WRITING-STYLE	63 (74)	13 (3)	74 (78)	19 (19)
CIVICS-ODD	59 (70)	1 (7)	40 (43)	4 (2)
CIVICS-EVEN	48 (62)	3 (1)	29 (42)	3 (3)

FACTOR INTERCORRELATIONS

RMS .... .026 (.027)
GFI .... .963 (.953)

	F1	F2
F1	1	
F2	827(852)	1

Percentage of Reliable Variance 85.8 (87.0)

[a] Decimal points have been omitted.

on the verbal factor. Biology and scientific method are almost entirely explained by the verbal factor. As expected, the two scientifically oriented reading passages (P_2 and P_5) had the lowest loadings on the verbal factor among the reading passages for sophomores. However, for seniors this difference decreases.

The correlations among the factors are quite high, .827 for sophomores and .852 for seniors. Part of this relatively high correlation may be artifactual in the sense that we identified the model by constraining the reading passages to have zero loadings on the math. If we re-estimate the model (which is still identified) relaxing that constraint, the correlation does go down to .80 for sophomores and .82 for seniors; and the two scientific reading passages have loadings of .15 (P_2) and .26 (P_5) on the math factor. The goodness of fit indices showed little change, and the remaining loadings showed little or no change.

The results seem to indicate that what starts out to be 6 distinct achievement areas can best be summarized as linear functions of a verbal factor and a math factor. With the exception of physics, the science areas reading passages, civics, and of course vocabulary, form a solid verbal factor. This pattern is quite stable as one goes from the sophomore to the senior year. That is, there is no change in the pattern of loadings as one goes from sophomore to senior. The only change, if any, is the increase in the general level of the loadings probably reflecting the increase in variance, which leads to an increase in reliability, which in turn is reflected in larger loadings. This phenomenon is, of course, consistent with a model that argues that the implementation of a treatment (or additional treatment) increases individual differences and the consequences thereof. The "bad news" aspect of these results is that the lack of specificity in many of the test measures suggests a low probability of finding differential curriculum effects on, for example, changes in science achievement over two years. The "good news" aspect is that there is no evidence that what we are measuring shows significant changes in structure or meaning over time in the total population. It does not appear that we have a problem of apples at one time and oranges at another.

Comparison of sophomore and senior Factor Patterns by Sex Group

Tables 14 and 15 presents the results of the two-factor model that was fitted separately to male and female sophomores and seniors respectively. The female loadings are shown in parentheses. Not surprisingly, the factor loading patterns for the sex groups are quite similar to each other at both the sophomore and senior level and show little or no difference from the total population results. The conclusions derived from the total sample apply equally well here.

Comparison of Sophomore-Senior Factor Patterns by Ethnic Group

Tables 16 and 17 present comparisons of factor patterns for black and white and for hispanic and white sophomores, respectively. Tables 18 and 19 show the parallel comparisions for 1982 seniors. There is little in the black-white comparison that suggests the tests have a different structure and thus a possibly different meaning for the two subpopulations. Although the pattern of loadings is very similar, there is a general level difference in loadings that, once again, seems to reflect the pattern of lower reliabilities for blacks. One interesting trend is that there appears to be a greater influence of verbal on black students' performance on the sciences subtests than for the whites (e.g., see Table 16). Inspection of the hispanic-white

Table 14

Two Factor Maximum Likelihood Solution For HS&B Male and Female Sophomores (   )

VARIABLE	FACTOR 1		FACTOR 2		RELIABILITIES		RELIABLE UNEXPLAINED VARIANCES	
VOC ODD	77	(78)	0	(0)	69	(69)	10	(8)
VOC EVEN	77	(78)	0	(0)	65	(65)	6	(4)
READ P1	61	(62)	0	(0)	48	(41)	11	(3)
READ P2	56	(59)	0	(0)	35	(40)	4	(6)
READ P3	64	(63)	0	(0)	45	(44)	4	(4)
READ P4	68	(65)	0	(0)	51	(50)	6	(7)
READ P5	54	(53)	0	(0)	40	(35)	10	(7)
M-ALG	0	(0)	85	(82)	73	(66)	0	(0)
M-ARITH	0	(0)	88	(86)	80	(76)	3	(2)
M-GEOM	0	(0)	72	(65)	56	(46)	4	(3)
S-BIO	45	(50)	11	(5)	33	(31)	3	(2)
S-CHEM	35	(30)	19	(9)	32	(17)	4	(3)
S-PHYS	35	(30)	29	(35)	52	(48)	14	(9)
S-E.S.	44	(41)	12	(11)	42	(32)	13	(6)
S-METHOD	63	(57)	10	(9)	49	(44)	0	(2)
W-PUNC	29	(36)	40	(31)	60	(60)	17	(19)
W-STYLE	62	(62)	18	(15)	73	(72)	14	(15)
CIV-ODD	57	(59)	4	(0)	42	(37)	6	(1)
CIV-EVEN	48	(47)	5	(2)	33	(26)	6	(2)

$r_{F_1F_2}$ = 82 (83)

RMS = .024 (.021)

GFI = .969 (.975)

Percentage of Reliable Variance ... 86.6 (88.5)

Table 15

Comparison of a 2-Factor Solution for White and Black ( ) 1982 Seniors

Parcels	Factor 1	Factor 2	Reliabilities	Reliable Unique Variances
VOC ODD	79 (77)	0 (0)	73 (68)	11 (9)
VOC EVEN	77 (75)	0 (0)	68 (63)	8 (6)
READING P1	60 (61)	0 (0)	42 (40)	6 (2)
READING P2	64 (49)	0 (0)	48 (29)	7 (5)
READING P3	66 (61)	0 (0)	48 (37)	4 (0)
READING P4	69 (62)	0 (0)	54 (48)	7 (10)
READING P5	60 (42)	0 (0)	46 (30)	10 (12)
M-ALG	0 (0)	86 (80)	73 (65)	0 (1)
M-ARITH	0 (0)	89 (82)	83 (72)	3 (5)
M-GEOM	0 (0)	76 (52)	62 (38)	4 (10)
S-BIOL	42 (47)	07 (07)	24 (33)	1 (5)
S-CHEM	30 (23)	26 (08)	37 (16)	8 (7)
S-PHYSIC	21 (33)	37 (30)	47 (49)	16 (14)
S-E.S.	32 (39)	18 (12)	36 (34)	12 (10)
S-METH	64 (57)	05 (11)	47 (38)	0 (0)
W-PUNCT	45 (21)	19 (43)	62 (56)	24 (19)
W-STYLE	72 (49)	02 (21)	72 (72)	18 (27)
CIV-ODD	69 (54)	-08 (05)	40 (34)	1 (1)
CIV-EVEN	61 (54)	01 (06)	41 (33)	2 (1)

$r_{F_1F_2}$ = 83(.79) RMS ..... .029 (.032) % of Reliable Varaince Explained ....

GFI ..... .951 (.935) 85.3 (83.8)

Table 16

White(Black) Comparison of a Two Factor Solution for 1980 Sophomores

VARIABLE	FACTOR 1	FACTOR 2	RELIABILITIES	RELIABLE UNEXPLAINED VARIANCES
VOC ODD	75 (71)	0 (0)	68 (57)	11 (7)
VOC EVEN	73 (70)	0 (0)	62 (55)	9 (6)
READ P1	59 (56)	0 (0)	41 (39)	6 (8)
READ P2	58 (48)	0 (0)	38 (28)	5 (5)
READ P3	63 (59)	0 (0)	44 (32)	5 (0)
READ P4	65 (59)	0 (0)	50 (42)	7 (6)
READ P5	54 (35)	0 (0)	38 (17)	9 (5)
M-ALG	0 (0)	83 (78)	68 (57)	0 (0)
M-ARITH	0 (0)	87 (78)	78 (63)	2 (2)
M-GEOM	0 (0)	70 (46)	53 (27)	4 (6)
S-BIO	39 (48)	9 (5)	25 (25)	4 (0)
S-CHEM	30 (25)	19 (3)	28 (7)	7 (0)
S-PHYS	23 (30)	34 (26)	43 (41)	14 (12)
S-E.S.	32 (49)	17 (-5)	34 (33)	13 (13)
S-METHOD	55 (58)	11 (8)	44 (34)	2 (7)
W-PUNC	33 (22)	30 (39)	60 (56)	25 (22)
W-STYLE	60 (52)	13 (17)	72 (63)	22 (18)
CIV-ODD	57 (50)	2 (3)	39 (27)	4 (0)
CIV-EVEN	45 (43)	5 (3)	29 (17)	4 (0)

$r_{F_1F_2}$ = 80 (80)

RMS = .028 (.031) Percentage of Reliable Varince 83.4 (87.1)

GFI = 962 (961)

Table 17

White(Hispanic) Comparison of a Two Factor Solution for 1980 Sophomores

VARIABLE	FACTOR 1	FACTOR 2	RELIABILITIES	RELIABLE UNEXPLAINED VARIANCES
VOC ODD	75 (70)	0 (0)	68 (60)	11 (11)
VOC EVEN	73 (69)	0 (0)	62 (55)	9 (8)
READ P1	59 (57)	0 (0)	41 (42)	6 (9)
READ P2	58 (43)	0 (0)	38 (24)	5 (6)
READ P3	63 (55)	0 (0)	44 (29)	5 (0)
READ P4	65 (56)	0 (0)	50 (34)	7 (3)
READ P5	54 (36)	0 (0)	38 (22)	9 (9)
M-ALG	0 (0)	83 (78)	68 (61)	0 (0)
M-ARITH	0 (0)	87 (79)	78 (67)	2 (4)
M-GEOM	0 (0)	70 (53)	53 (27)	4 (0)
S-BIO	39 (54)	9 (1)	25 (31)	4 (2)
S-CHEM	30 (30)	19 (4)	28 (12)	7 (1)
S-PHYS	23 (26)	34 (33)	43 (47)	14 (15)
S-E.S.	32 (47)	17 (3)	34 (32)	13 (8)
S-METHOD	55 (60)	11 (3)	44 (37)	2 (0)
W-PUNC	33 (36)	30 (25)	60 (55)	25 (21)
W-STYLE	60 (64)	13 (5)	72 (66)	22 (19)
CIV-ODD	57 (59)	2 (-6)	39 (36)	4 (7)
CIV-EVEN	45 (58)	5 (-16)	29 (23)	4 (3)

$r_{F_1F_2}$ = 80 (84)

RMS = .028 (.028)

GFI = 962 (966)

Percentage of Reliable Variance .... 83.4 (84.1) comparison in Table 17 also shows a greater overlap of verbal and the science subtests for hispanics. It may be that blacks and hispanics are more likely to come from home and school environments offering less opportunity to learn about the scientific concepts addressed by the subtest. As a result, their performance depends, to a greater extent, on general verbal knowledge. That is, if certain subpopulations either do not have the opportunity or, for whatever reason, are less likely to take advantage of the opportunity, to take additional instruction in specialized areas, we would expect their correlational structure on achievement tests to be driven by a general verbal factor.

Tables 18 and 19 present the factor loading coefficients and accompanying goodness of fit indices for white-black and white-hispanic senior comparisons, respectively. Generally the pattern of salient and nonsalient loadings are quite similar to the sophomore results. One main difference is that the loadings for all groups show slight increases, which, in turn, reflect the increase in between-individual variation (and thus reliability) that is due to continuation of the educational treatment. Although the "treatment" may have increased between-individual variation within each achievement area, it did not appear to significantly increase the differentiation between the verbal and quantitative factor. Inspection of possible patterns among the normalized residuals did not reveal systematic patterns that would suggest the possibility that additional, albeit small, factors were present. However, small correlated residuals were found between the fifth reading passage (science orientation) and the geometry parcel. Similar sized residuals were found between the physics parcel and the earth science scientific parcel. These correlated residuals, while not statistically significant, occurred in all three subpopulations.

Table 18

Comparison of a 2-Factor Solution for Male and Female ( ) 1982 Seniors

Parcels	Factor 1	Factor 2	Reliabilities	Reliable Unique Variance
VOC ODD	80 (83)	0	74 (75)	11 (07)
VOC EVEN	80 (82)	0	72 (72)	08 (02)
READING P1	64 (64)	0	50 (39)	10 (0)
READING P2	62 (65)	0	44 (48)	06 (06)
READING P3	67 (68)	0	49 (48)	05 (02)
READING P4	71 (70)	0	55 (56)	05 (07)
READING P5	62 (58)	0	49 (44)	11 (10)
M-ALG	0	88 (85)	76 (72)	0 (0)
M-ARITH	0	90 (88)	84 (81)	2 (05)
M-GEOM	0	76 (72)	64 (57)	4 (06)
S-BIOL	52 (51)	04 (03)	33 (31)	2 (02)
S-CHEM	40 (27)	22 (20)	43 (26)	08 (05)
S-PHYSIC	44 (33)	21 (33)	57 (52)	17 (08)
S-E.S.	50 (44)	08 (10)	44 (36)	11 (07)
S-METH	70 (67)	04 (03)	54 (47)	0 (0)
W-FUNCT	33 (47)	38 (23)	62 (61)	14 (16)
W-STYLE	70 (71)	20 (06)	78 (78)	14 (17)
CIV-ODD	69 (67)	-04 (05)	44 (41)	1 (02)
CIV-EVEN	57 (62)	07 (-1)	43 (40)	3 (02)

$r_{F_1 F_2}$ = 83(.83)   RMS ...... .023 (.025)   % of Reliable Variance 87.4 (88.3)

GFI ...... .939 (.967)

Table 19

Comparison of a 2-Factor Solution for White and Hispanic ( ) 1982 Seniors

Parcels	Factor 1	Factor 2	Reliabilities	Reliable Unique Variance
VOC ODD	79 (76)	0 (0)	73 (69)	11 (11)
VOC EVEN	77 (75)	0 (0)	68 (66)	8 (10)
READING P1	60 (60)	0 (0)	42 (41)	6 (5)
READING P2	64 (54)	0 (0)	48 (34)	7 (5)
READING P3	66 (58)	0 (0)	48 (34)	4 (0)
READING P4	69 (63)	0 (0)	54 (45)	7 (5)
READING P5	60 (46)	0 (0)	46 (29)	10 (7)
M-ALG	0 (0)	86 (81)	73 (66)	0 (0)
M-ARITH	0 (0)	89 (84)	83 (74)	3 (3)
M-GEOM	0 (0)	76 (60)	62 (40)	4 (5)
S-BIOL	42 (59)	07 (-08)	24 (29)	1 (2)
S-CHEM	30 (23)	26 (19)	37 (23)	8 (7)
S-PHYSIC	21 (38)	37 (24)	47 (51)	16 (15)
S-E.S.	32 (42)	18 (11)	36 (39)	12 (12)
S-METH	64 (66)	05 (01)	47 (45)	0 (0)
W-PUNCT	45 (63)	19 (03)	62 (57)	24 (15)
W-STYLE	72 (93)	02 (-19)	72 (74)	18 (14)
CIV-ODD	69 (71)	-08 (-14)	40 (39)	1 (4)
CIV-EVEN	61 (67)	01 (-13)	41 (36)	2 (4)

$r_{F_1F_2}$ = 83(.86) RMS ..... .029 (.029) % of Reliable Varaince Explained 85.3 (86.0)

GFI ..... .951 (.957)

Similar to the sophomore cohort finding, there remains the greater saturation of the verbal factor of hispanic performance on both the science parcels and the writing parcels. Obviously, verbal language skills are critical to hispanics for performance in science as well as writing. As pointed out earlier in connection with the black-white contrast at the sophomore level, there is some evidence that performance on science for black seniors is more heavily tied to general verbal ability than is the case for whites.

A technical note is in order here. From a statistical viewpoint, the preferable method of comparing factor patterns across populations is to analyze the variance-covariance matrices, rather than the correlation matrix. The theoretical advantage of factoring the variance-covariance matrix is that the factor loadings will be less affected by changes in the relative variability of the traits under examination from one population to another. The MLH factor loadings estimated on variance-covariance data are the raw score regression weights of the observed variables on the factors and thus relatively invariant with respect to selection. The problem with the variance-covariance approach is that interpretation of the resulting loadings in their original metric is often meaningless. In this case, all analyses were run twice, once on the correlation matrix and once on the variance-covariance matrix. Both runs were then inspected to insure that the same conclusion would be drawn about the salient loadings within each population.

Inspection of the variance-covariance generated factor loadings revealed the same general pattern of loadings as was found in the standardized solution. However, the original difference between whites and blacks and between whites and hispanics in the general level of the loadings was somewhat reduced. This is to be expected, since the reduced variances in both the black and hispanic population would have less effect on the unstandardized factor loadings.

In summary, there is little if any change in factor structure either cross-sectionally (i.e., when comparing senior cohorts) or in the longitudinal analysis of the sophomore-senior transition. With the exception of writing style, punctuation parcels, and the physics parcel, the remaining parcels seem to possess little or no unique reliable variance beyond that which can be explained by a verbal and/or math factor. Black and hispanic factor structures are quite similar to white structures with the exception that performance on the science measures has a larger verbal component for hispanics than for whites. A similar, although less pronounced finding, occurs when comparing the black and white structures. One somewhat surprising result is that there is no increased differentiation between the verbal and math factors when going from sophomore to senior status (as measured by the factor intercorrelation). However, there is increased differentiation between individuals (as measured by increased test score variance) as the transition from sophomore to senior occurs. It is possible that more achievement factors and additional factor differentiation would emerge if populations were defined by curriculum. Individuals in the academic curriculum would be more likely to take additional specialized courses in areas of particular interest or skill. This should lead to more differentiation. In sum, there is little empirical evidence for the notion that the tests or test parcels measure different things for different ethnic or sex groups.

Scoring and Equating Using Item Response Theory (IRT)

Item Response Theory (IRT) was used to score tests within population (1980-1982) and to score and equate tests across populations. IRT methods were used to put mathematics, vocabulary, and reading scores on the same scale for 1972, 1980, and 1982 seniors. Similarly, IRT methods were used to score all the HS&B tests given to individuals as sophomores and repeated as seniors. The three parameter IRT model was selected over the one and two parameter models because of the possibility that guessing and/or speededness might be additional confounding sources of variance. Item response theory describes the probability of answering an item correctly as a mathematical function of ability level or skill. The mathematical function used here, the logistic function, has one parameter for each individual--ability level--and three parameters characterizing each item (Lord, 1980, Lord & Novick, 1968). The item parameters reflect difficulty level (b_i), discriminating power (a_i), and the likelihood of low ability individuals guessing the right answer (c_i). The function that relates the probability of passing a particular item i for a person of ability θ in terms of the item parameters is:

$$P_i(\theta) = c_i + (1-c_i)\frac{1}{[1+\exp\ -Da_i(\theta - b_i)]} \qquad (1)$$

where $D \cong 1.7$

b_i = item difficulty corresponding to the value of θ halfway between the guessing parameter and 1.0

a_i = discrimination parameter reflecting the steepness of the item characteristic curve at its point of inflection

c_i = "guessing parameter" probability of a person with very low ability getting the item correct

θ = a person's ability parameter usually standardized with mean 0 and standard deviation of 1.0

and $P_i(\theta)$ = probability of correct response of a person of ability level θ.

A person's number right true score (NRTS) is the simple sum of that particular person's $P_i(\theta)$'s. Thus, the scoring weights each item receives in the summation to arrive at NRTS are a function of the interaction of the item parameters with the person's θ or ability level. That is, the item characteristic functions, $P_i(\theta)$'s, provide a different score for a given item, depending upon a person's ability level. Inspection of the item characteristic function in equation (1) suggests that, for high ability people, the item score for a given item i will primarily depend on how much higher the person's θ is compared to the item difficulty (b_i, also measured in θ units), and how discriminating the item is.

A low-ability person will get little credit on a difficult item, even if he or she were to get it correct, because the model argues that the correct answer was probably guessed. This readily follows from equation (1). Such a person might have a θ (ability level) that was negative, say -1.5, and the b_i for a difficult item on the θ scale might be 2.0, and, since a_i is always positive, the denominator of equation (1) would become large in relation to the numerator. The limit here as the denominator gets larger is a scoring weight $P_i(\theta)$ equal to c_i the guessing parameter.

The fact that the item scores that are summed to get the number right true score are a function of the person's ability level θ, discrimination, difficulty, and guessing parameters, suggests that IRT scoring can be beneficial if (1) people with low ability can get the right answer by guessing; (2) items in the test vary in both difficulty and discrimination and thus an optimal scoring procedure should take this into account; (3) there are test center administration irregularities with respect to directions or timing that may lead to varying levels of items attempted and (4) the purpose is to put tests that share some but not all of the smae items on the same scale.

The ability of IRT methods to deal with individuals or groups characterized by differences in the propensity to attempt items is particularly pertinent here for appropriate cross-sectional comparisons between the seniors of 1972 and the seniors of 1980. As pointed out earlier in this report, there was a systematic tendency for the seniors in 1980 to attempt more items than did the seniors of 1972. The most likely reason for this result was the change in 1980 from a separate answer sheet to an answer sheet as part of the test booklet. As described earlier, previous research has shown that a mechanical change of this nature can lead to a significant increase in the number of attempts. At any rate, IRT scoring can minimize the impact of such confounding sources on test score variance, since the individual ability score, θ, is based only on items attempted. Therefore, the number of items attempted is controlled for in the estimation of θ.

IRT methodology was used to put the 1972, 1980, and 1982 seniors on the same scale in vocabulary, math, and reading. This was accomplished by pooling samples from the 1972, 1980, and 1982 senior data and estimating the item and ability parameters (θ) for the items and individuals. More specifically, items that were not present for a particular administration were treated as items not attempted for an individual at that administration. Thus a person's ability parameter, θ, would be estimated from the common "core" items, (i.e., items common to all three administrations) and the items unique to his or her administration.

The IRT parameters were estimated using the Logist computer program (Wood, R.L., Wingersky, M.S., & Lord. F.M., 1976). Computer runs were based on random samples of 2,000 individuals from each cohort, all of whom had attempted at least fifteen items. Once the item parameters were established for the tests based on the subsamples, Logist was applied to the full sample of 1972, 1980, and 1982 seniors to estimate the ability (θ) of each individual in each of the subject areas tested. Since a person's ability estimate, θ, was based on only those items attempted, individuals who attempted only the first three or four items and got them all correct would have a grossly overestimated θ. Plots of observed formula scores against θ were inspected for those individuals who attempted 1 through 10 items. Only a handful of examiness had θ's inconsistent with their observed formula scores. No θ's were estimated for these individuals. Using the θ's and the item parameters from the 1972 senior tests (vocabulary, reading and math), the probability of passing each of the 1972 test items in each of the subject areas was estimated for each individual, regardless of his or her cohort. The sum of these probabilities is an individual's number right true score (NRTS). In this fashion, we can estimate the NRTS on the 1972 items for any individual from the 1980 or 1982 senior population.

In a sense we are asking how would individuals from the 1980 and 1982 senior cohorts score if they had taken the 1972 items. This makes possible the desired cross-sectional comparison of scores across senior cohorts. Having estimated NRTS for all senior cohorts as if they had taken the 1972 test items, the scores were then transformed to a formula scored scale using a simple algorithm. This transformation puts the "formula scored number right true scores" on a scale similar to the formula scored observed scores.

In addition to estimating NRTS for the 1972 test items, NRTS were estimated for each individual on his own set of tests. For the longitudinal IRT scaling, item parameters were calibrated separately for sophomores and seniors and then transformed to the senior scale. Tests that were present in 1982 but not in 1972 or 1980 were treated somewhat differently because of their relatively short length from an IRT perspective. For the science and writing tests, the full samples of approximately 24,000 sophomores and 25,000 seniors were used in the item calibration runs instead of subsamples, since additional observations can help to overcome possible instability of estimates caused by small numbers of items. Because of its very short length (10 items) and its diversity of subject material, the civics test was considered inappropriate for IRT scaling. The IRT parameters are presented in Appendix F.

Cross-Sectional Comparisons of Test Score Change

Figures 5-10 present "box and whisker" plots of vocabulary performance for the three administrations to seniors and the one to sophomores. Figure 5 shows the total group, and Figures 6-10 show senior and sophomore vocabulary performance by sex and ethnic groups. It should be kept in mind that all these cross-sectional comparisions are based on estimated formula corrected number right true scores on the 1972 test items. The results are based on the data and included every sampled senior who was still in school and sophomores who remained in school at least until the senior testing.

The box and whisker plots show the 10th and 90th percentile (the ends of the whiskers) and the 25th and 75th percentile (the lower and upper end of the

VOCABULARY: TO

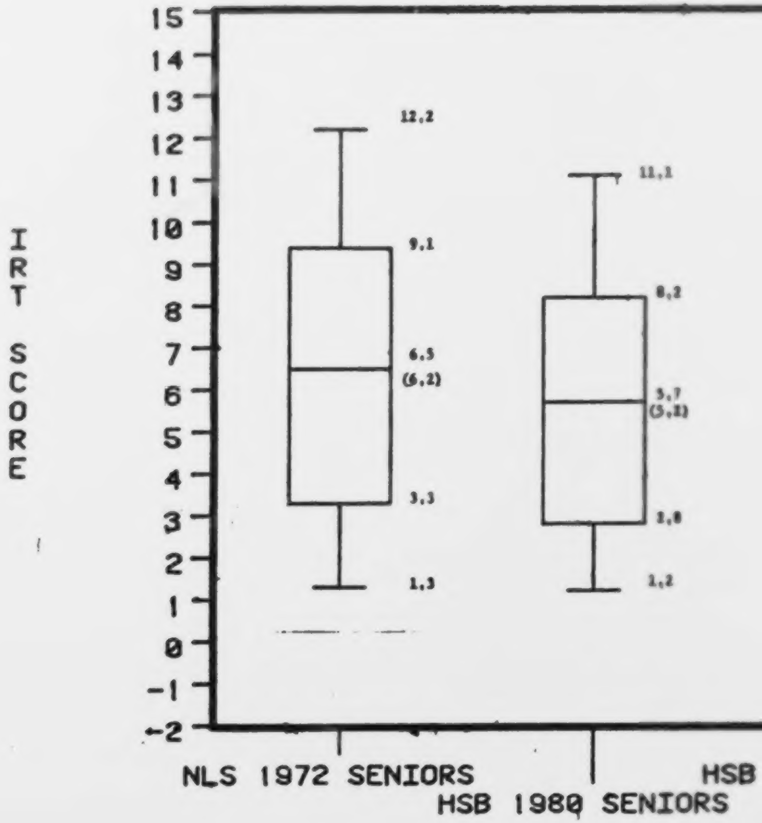
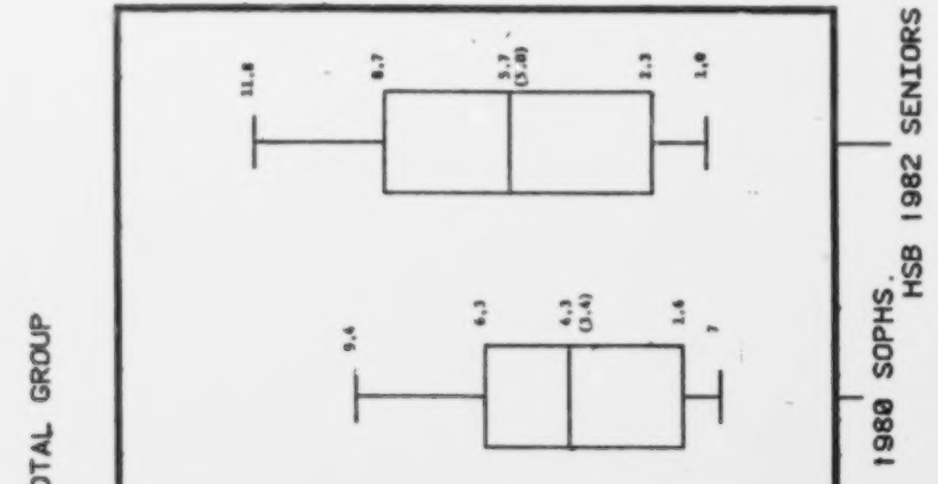
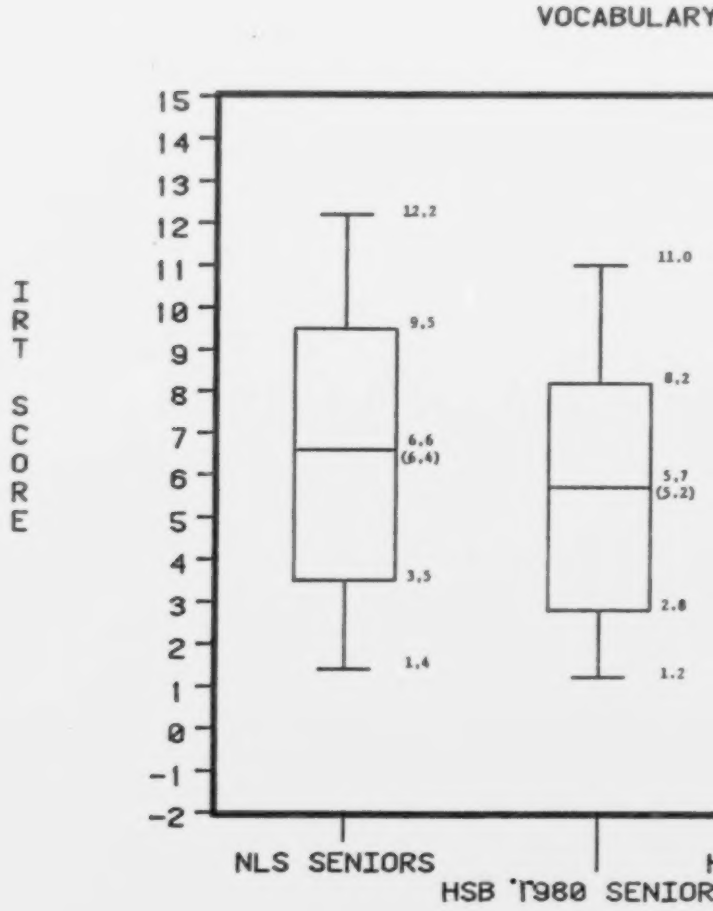


Figure 5
Vocabulary: Total Group




VOCABULARY
IRT SCORE
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2
12.2
9.5
6.6
(6.4)
3.5
1.4
11.0
8.2
5.7
(5.2)
2.8
1.2
NLS SENIORS
HSB 1980 SENIOR

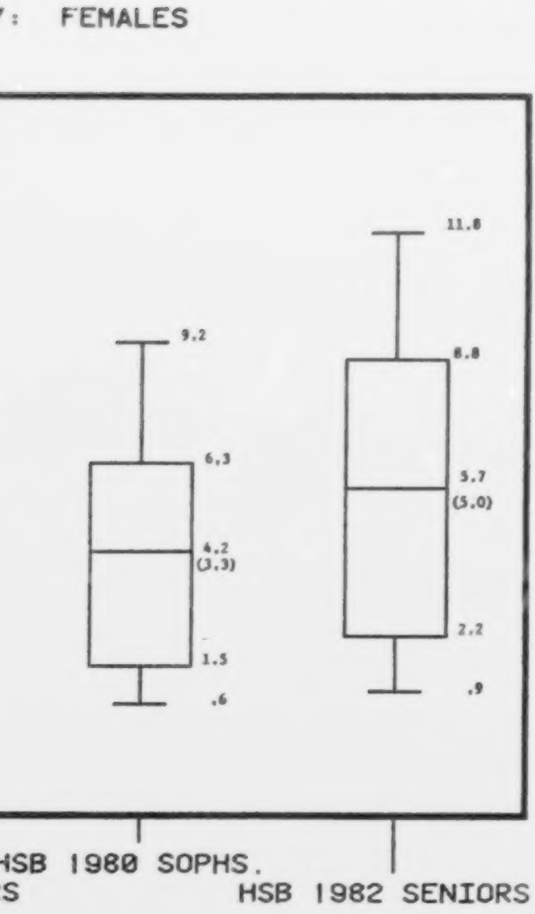
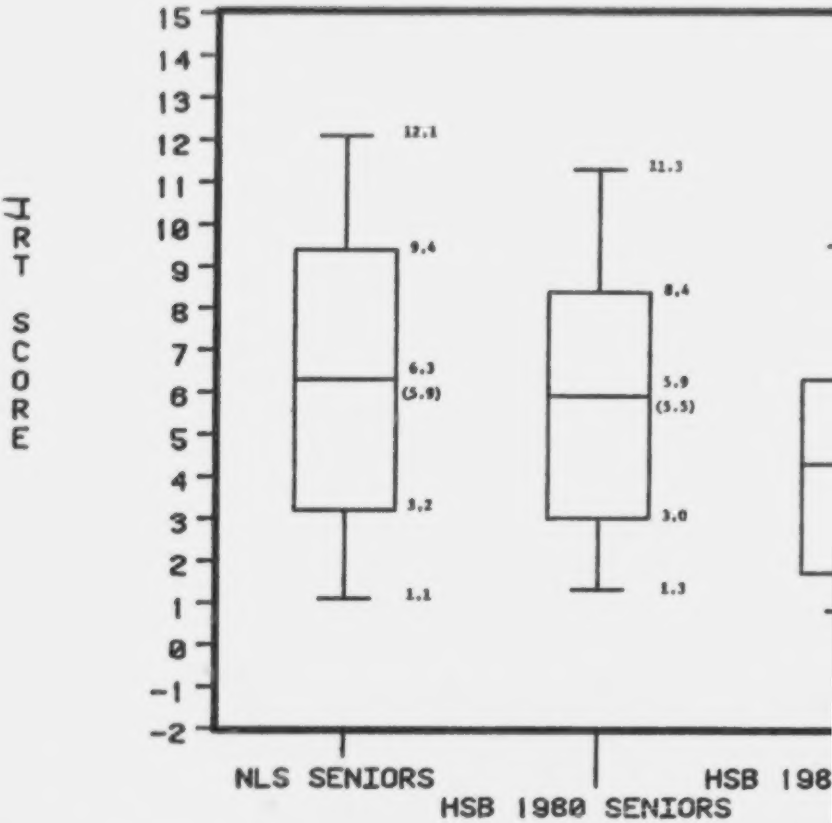


Figure 6

Vocabulary: Females

VOCABULARY: MA



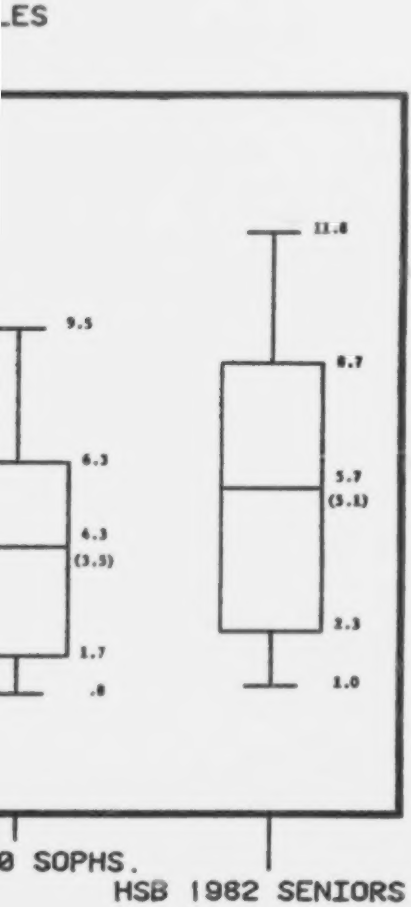
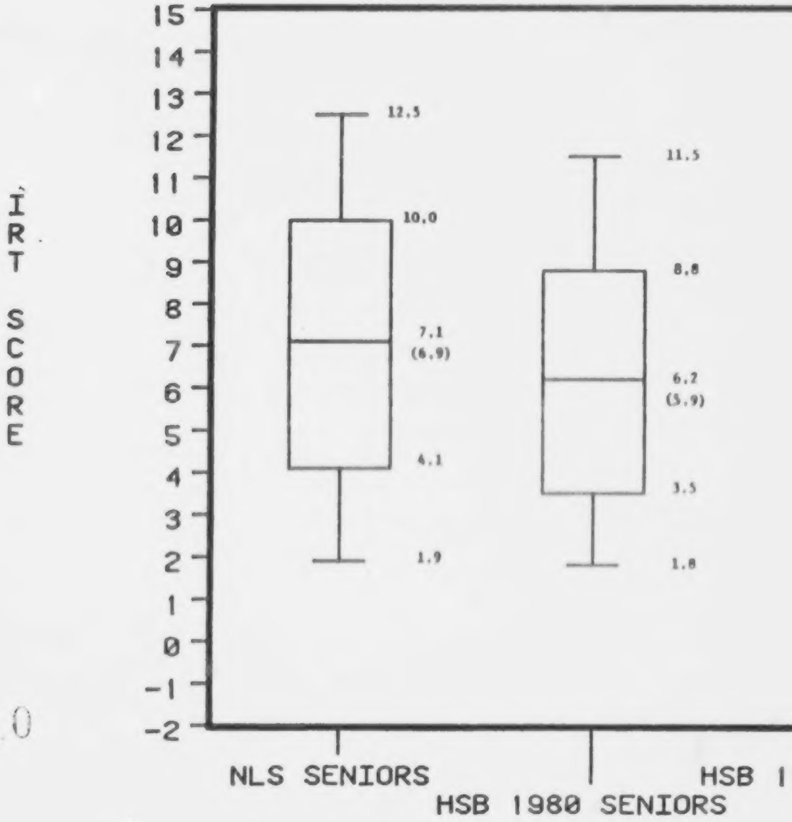


Figure 7

Vocabulary: Males

VOCABULARY: W



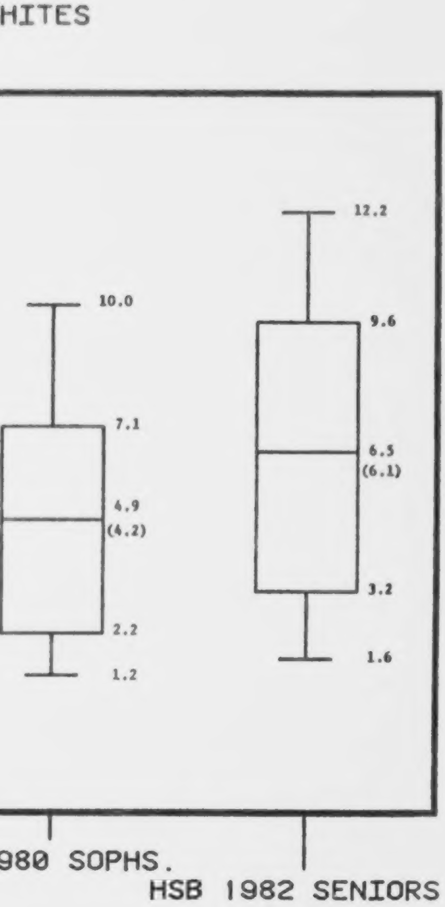
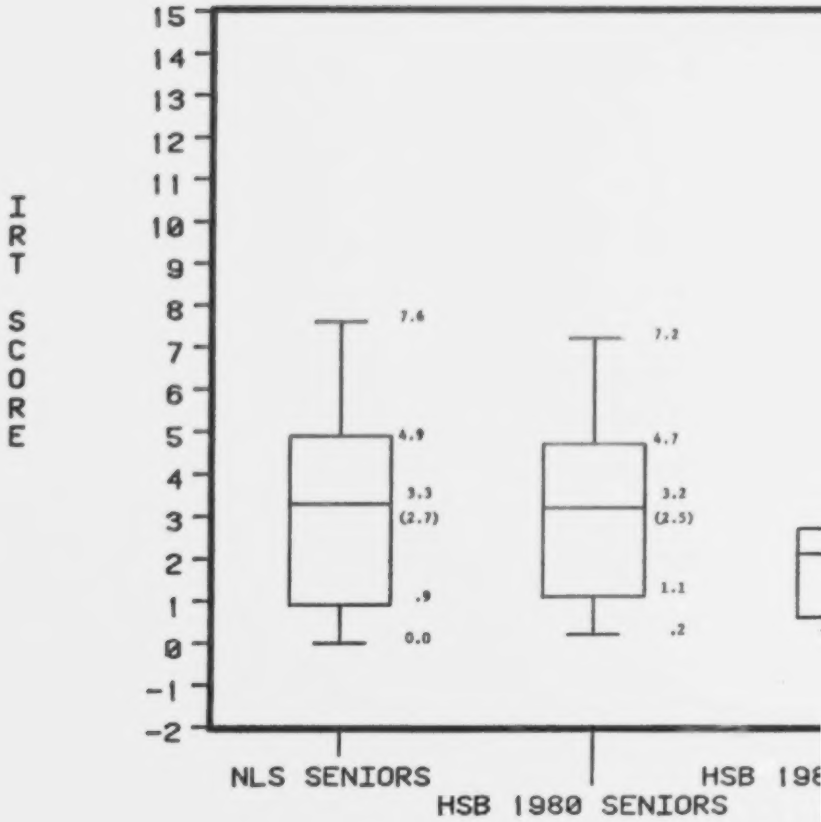


Figure 8
Vocabulary: Whites

VOCABULARY: BL



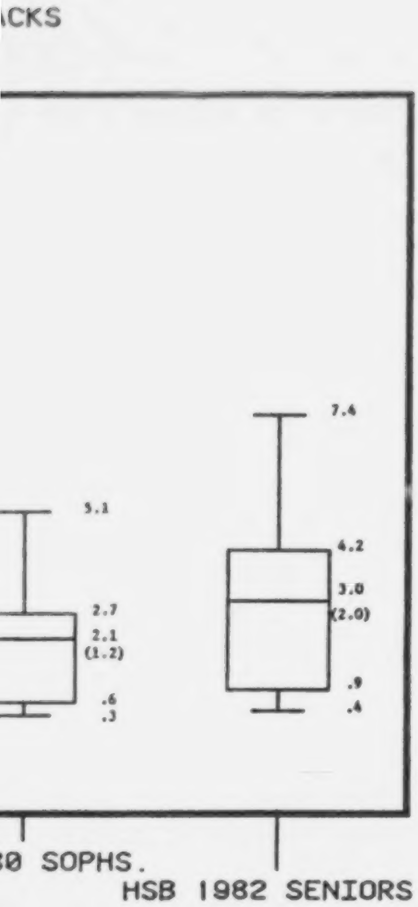


Figure 9
Vocabulary: Blacks

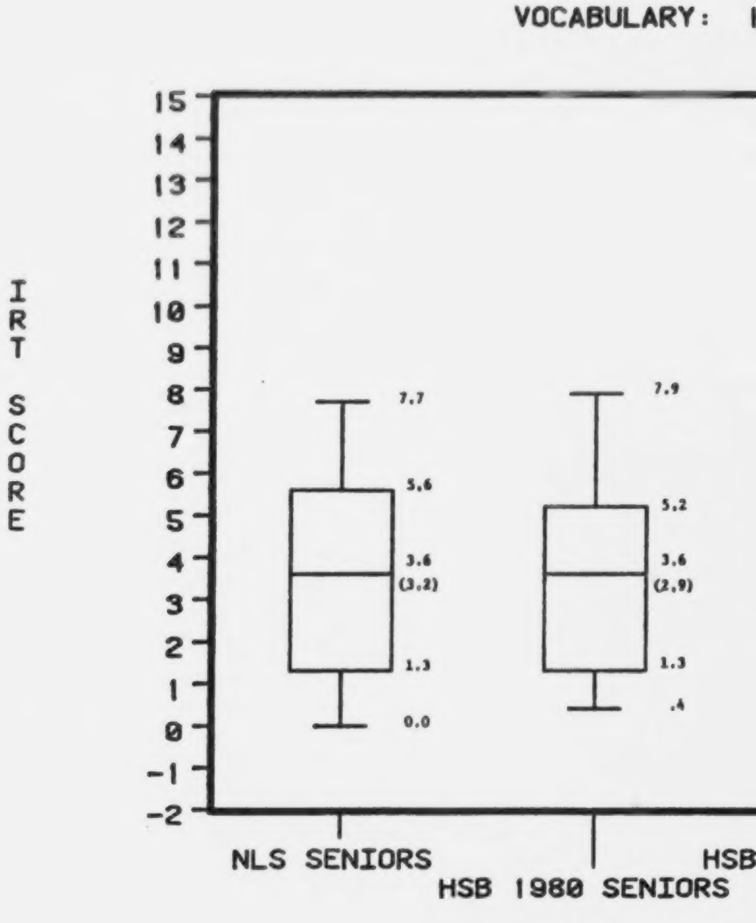
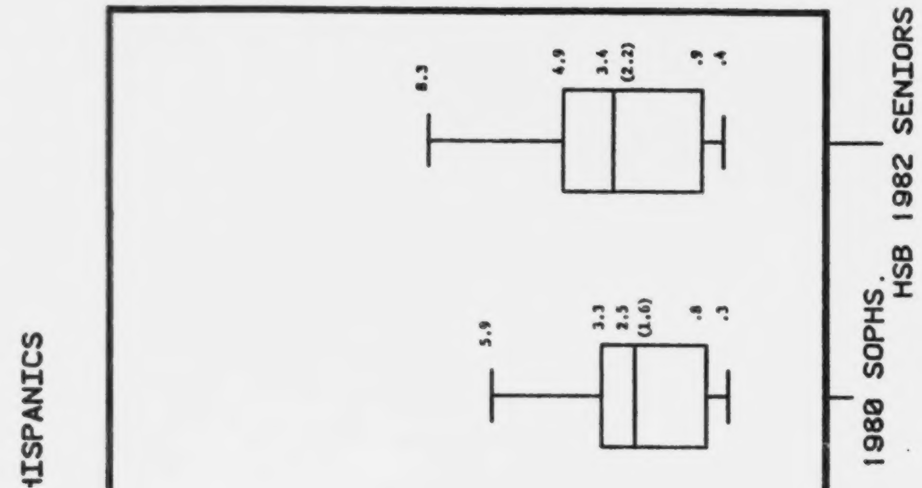

VOCABULARY:
IRT SCORE
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2
7.7
5.6
3.6
(3.2)
1.3
0.0
7.9
5.2
3.6
(2.9)
1.3
.4
NLS SENIORS
HSB 1980 SENIORS
HSB

Figure 10

Vocabulary: Hispanics



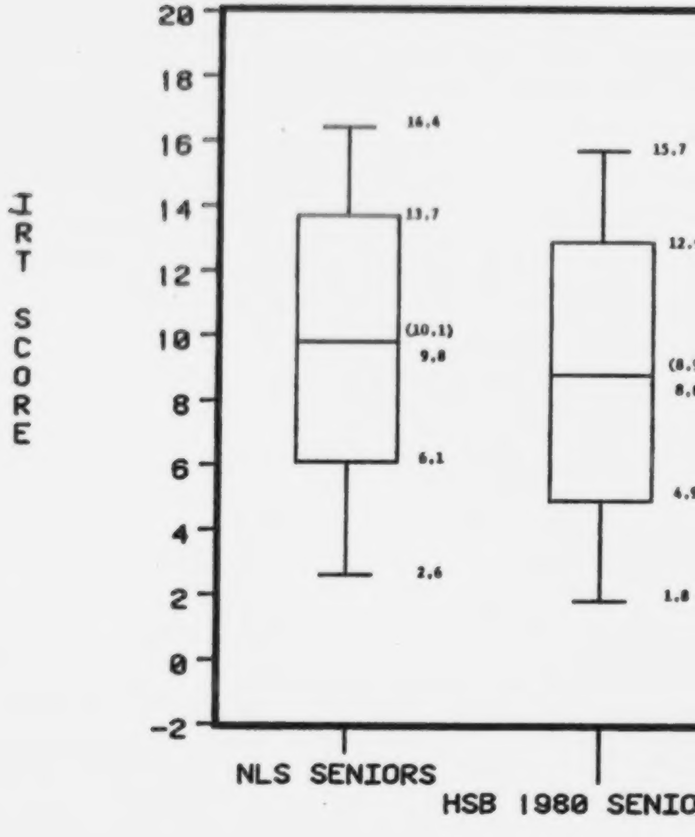
boxes), and the means and medians. The medians are shown in parentheses. Inspection of the vocabulary results for the total sample suggest that while there is a senior vocabulary mean performance decline from 1972 to 1980, it levels off between 1980 and 1982. An indication of the possible impact of the educational treatment on increasing the diversity of performance can be shown by the comparison of the sophomore-senior variances.

When the total population is split into sex groups, Figures 6 and 7, there is little differential change by sex groups in means when the 1980 and 1982 senior cohorts are compared. Figures 6 and 7 do show that 1972 to 1980 decline was less for males than for females (.4 versus .9).

Inspection of the results for the white, black, and hispanic populations, Figures 8-10, show that while there is virtually no decline for blacks and hispanics between 1972 and 1980, whites show significant declines. The white vocabulary mean increases from 1980 seniors to 1982 seniors while both the blacks and hispanics decline during this two-year period. These 1980 to 1982 senior results would be consistent with a hypothesis that a larger proportion of those blacks and hispanics who in the past tended to drop out of school are now staying in school, (possibly because of the implementation of special programs).

Reading scores (Figures 11-16) in the total senior populations show substantial declines from 1972-1980-1982. Although the "box and whisker" plots do not show any greater diversity in reading ability when going from 1980 to 1982 seniors there is a noticeable "bulge" of low-reading ability people as indicated by the short whisker in 1982. Inspection of the sex groups and the ethnic groups suggest that the decline is relatively consistent across all groups. Inspection of the box and whisker plots for blacks suggest that a decrease in diversity or variance as well as in means is occurring.

READING:



IRT SCORE
20
18
16
14
12
10
8
6
4
2
0
-2
16.4
13.7
(10.1)
9.8
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12.
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NLS SENIORS
HSB 1980 SENIO

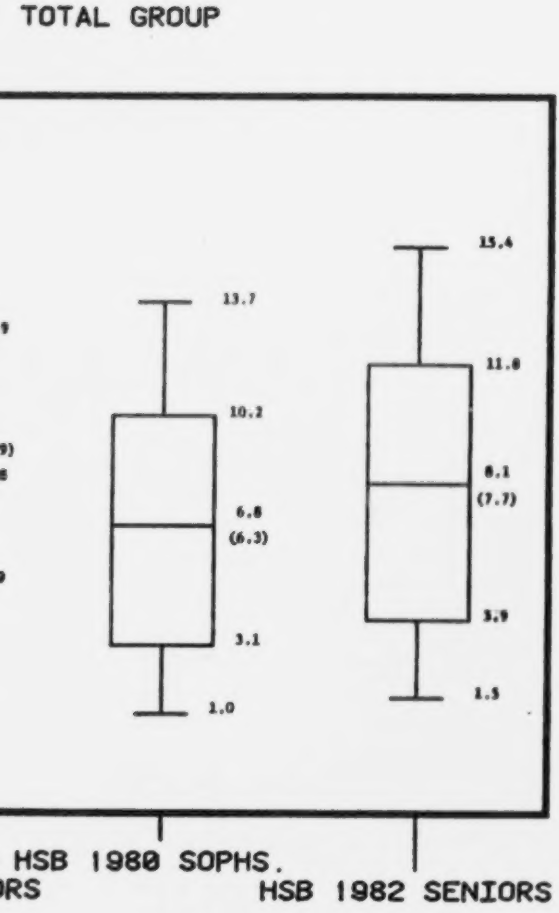
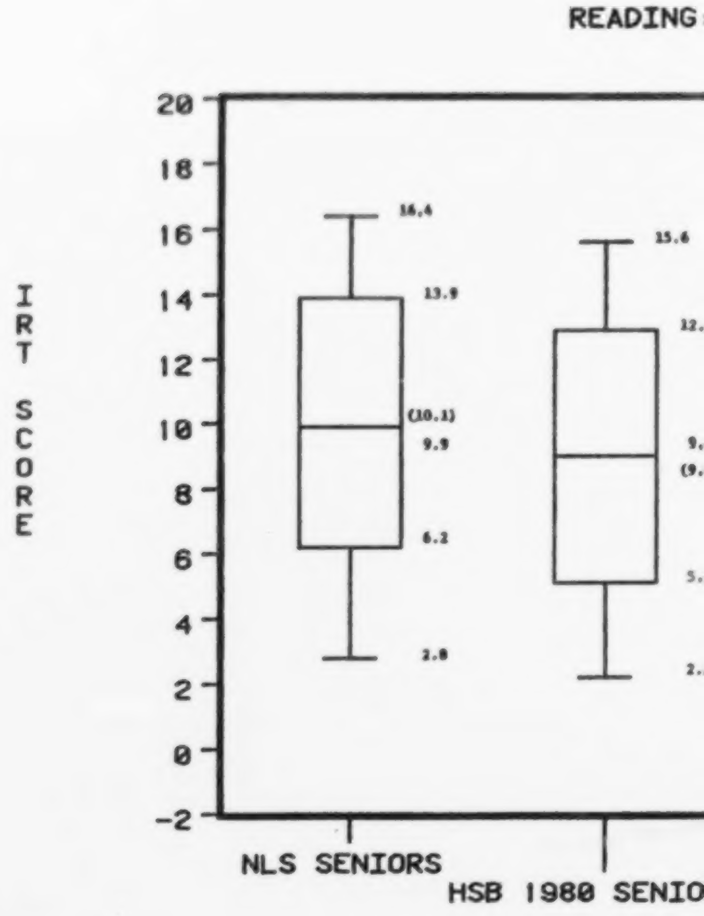


Figure 11
Reading: Total Group


READING
IRT SCORE
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16.4
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NLS SENIORS
HSB 1980 SENIO

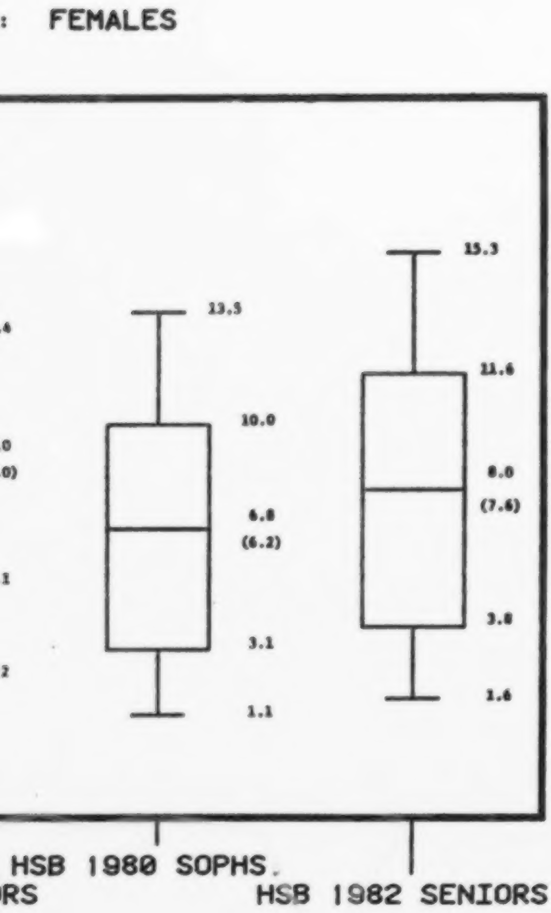
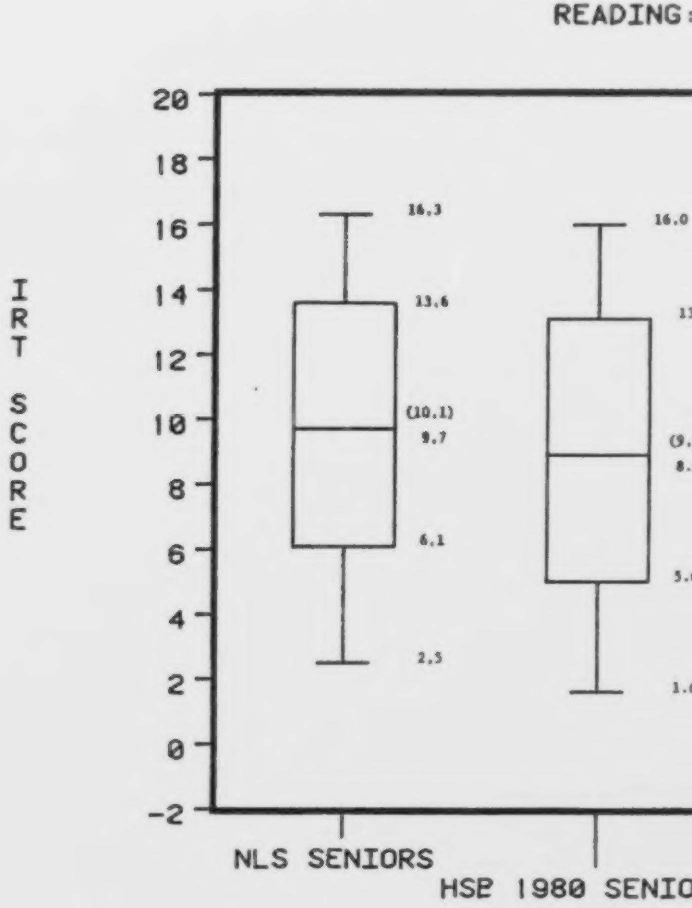


Figure 12
Reading: Females


READING:
IRT SCORE
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8
6
4
2
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-2
16.3
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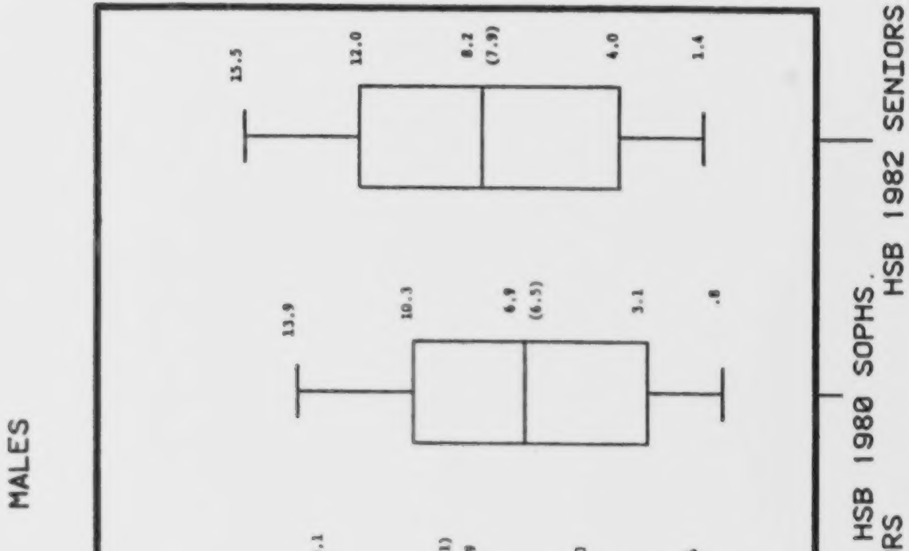
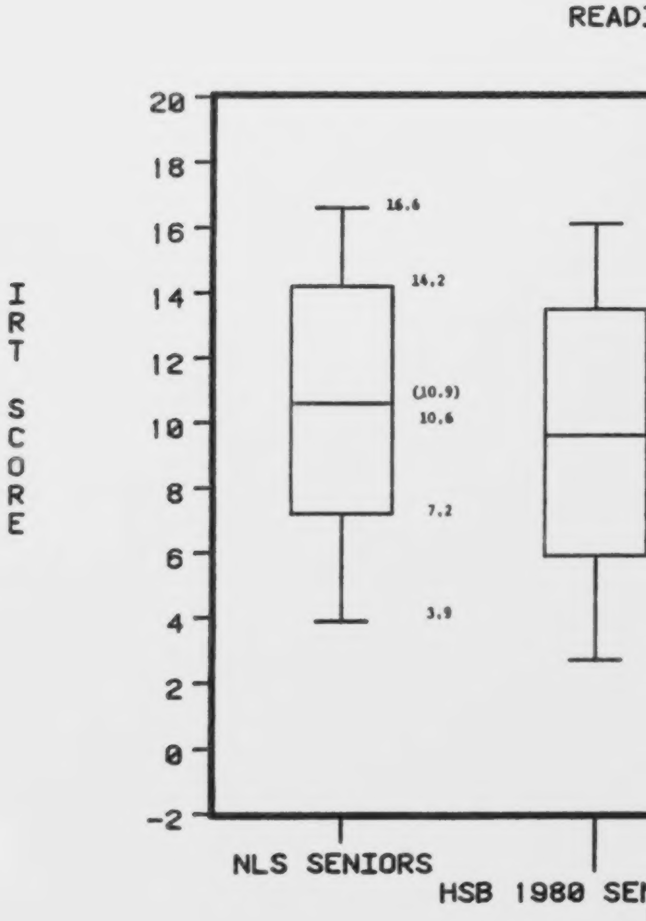
(10.1)
9.7
6.1
2.5
16.0
NLS SENIORS
HSB 1980 SENIO

Figure 13

Reading: Males




READI
IRT SCORE
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16.6
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(10.9)
10.6
7.2
3.9
NLS SENIORS
HSB 1980 SE

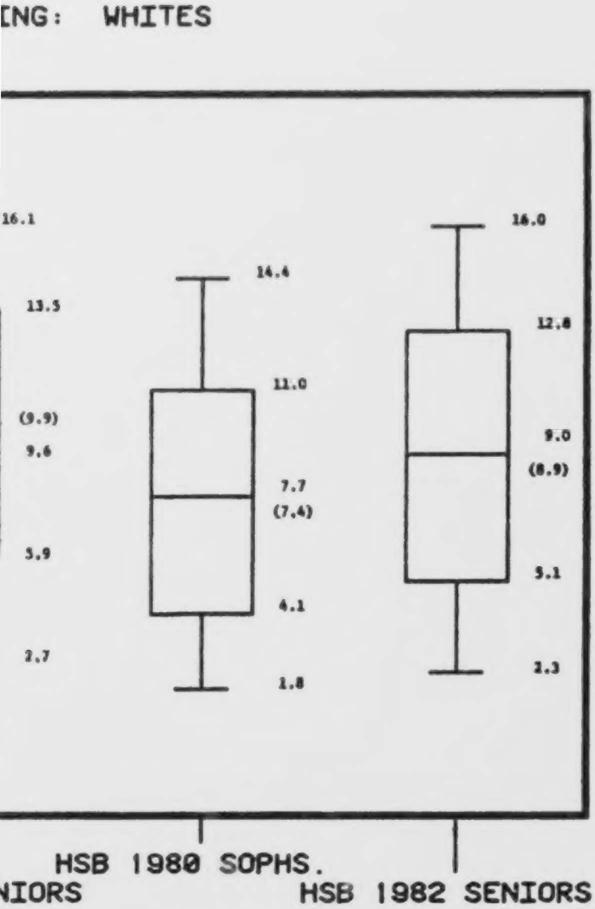
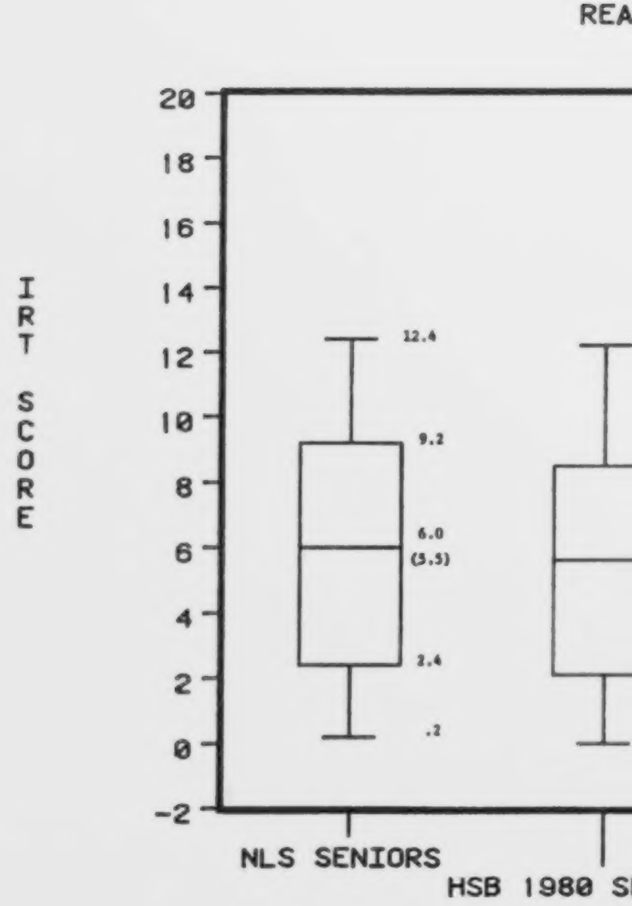


Figure 14
Reading: Whites


REA
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18
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12
10
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6
4
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IRT SCORE
12.4
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(5.5)
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NLS SENIORS
HSB 1980 S

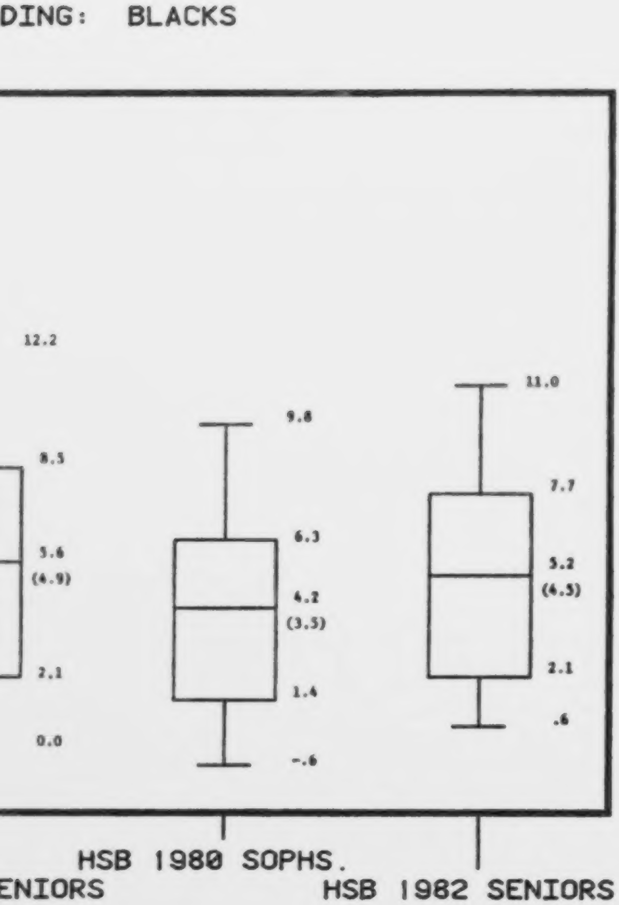

Figure 15
Reading: Blacks

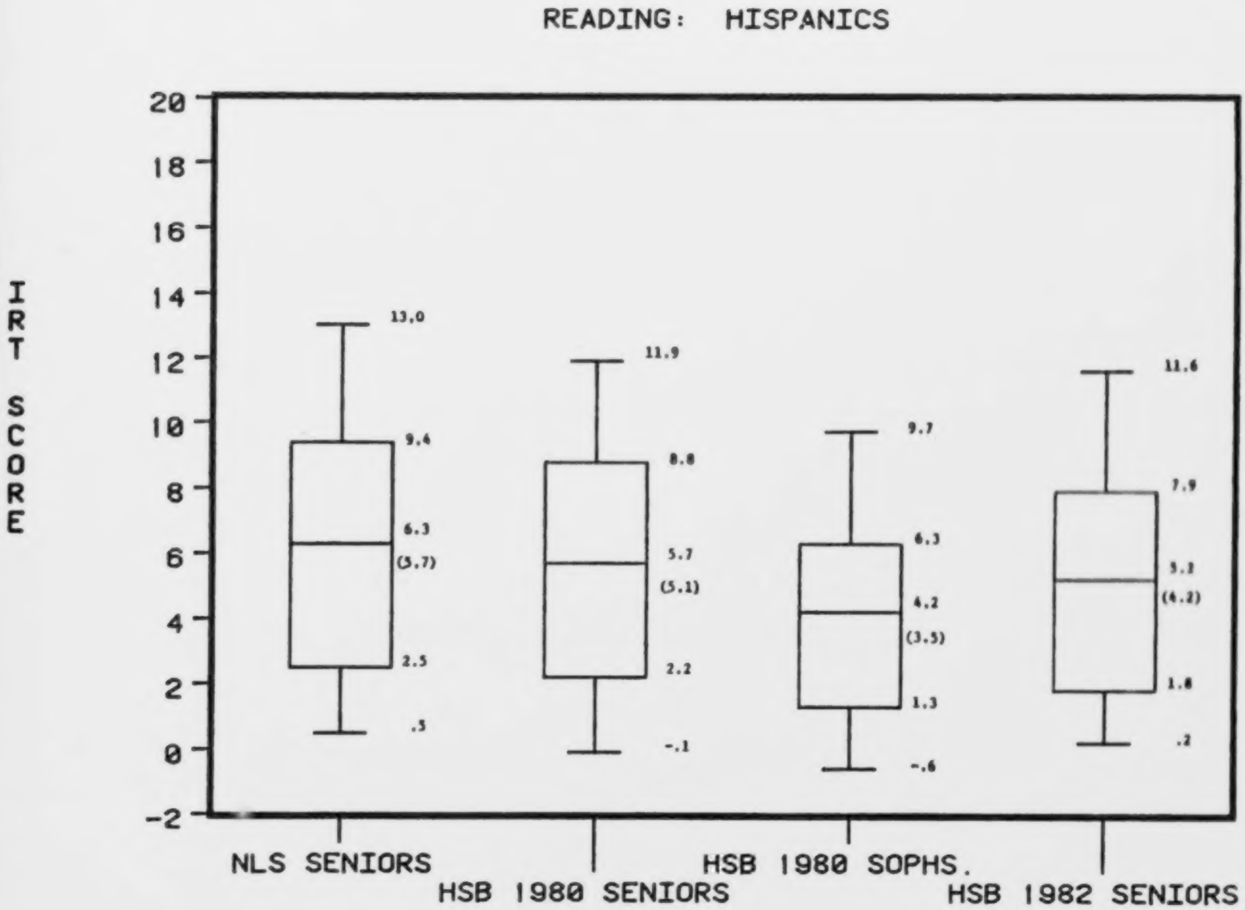

Figure 16
Reading: Hispanics

The mathematics scores (Figures 17-22) show a consistent decline for total seniors from 1972 to 1980 to 1982. When you look at the sex groups, the decline for seniors from 1972 to 1980 to 1982 is there in both sex groups. Inspection of the ethnic group results show declines for all groups with hispanics characterized by slightly greater declines.

Longitudinal Changes in Test Scores

Table 20 presents the number of observations used to calculate the IRT test score statistics by subpopulations. It should be noted that the smallest subpopulation, black male sophomores, had more than 1,200 cases. Table 21 presents a comparison of vocabulary test score statistics for sophomore and senior totals and by subpopulations. The entries in the last column of Table 21 under the label "gain" are simply the differences between the means ($\overline{X}$ (SEN)-$\overline{X}$ (SOPH)) divided by the sophomore standard deviation. With the exception of hispanics, all ethnic and sex groups show average gains in vocabulary somewhat over a third of a standard deviation. It is also interesting to note that the Vocabulary score gap between whites and blacks and whites and hispanics increases as one goes from the sophomore to senior year. We would expect this increasing knowledge gap to be at least in part due to possible curriculum differences. Another interesting finding is that, with the exception of black females, the vocabulary gap between males and females is reduced as one moves from sophomore to senior status. Once again, this differential gain may reflect differences in curriculum choices.

Table 22 presents the results on performance changes in reading. Similar to the results in vocabulary, the gap in reading skills between whites and the other two ethnic groups shows an increase over the two additional years of schooling. However, unlike the vocabulary area, there is no

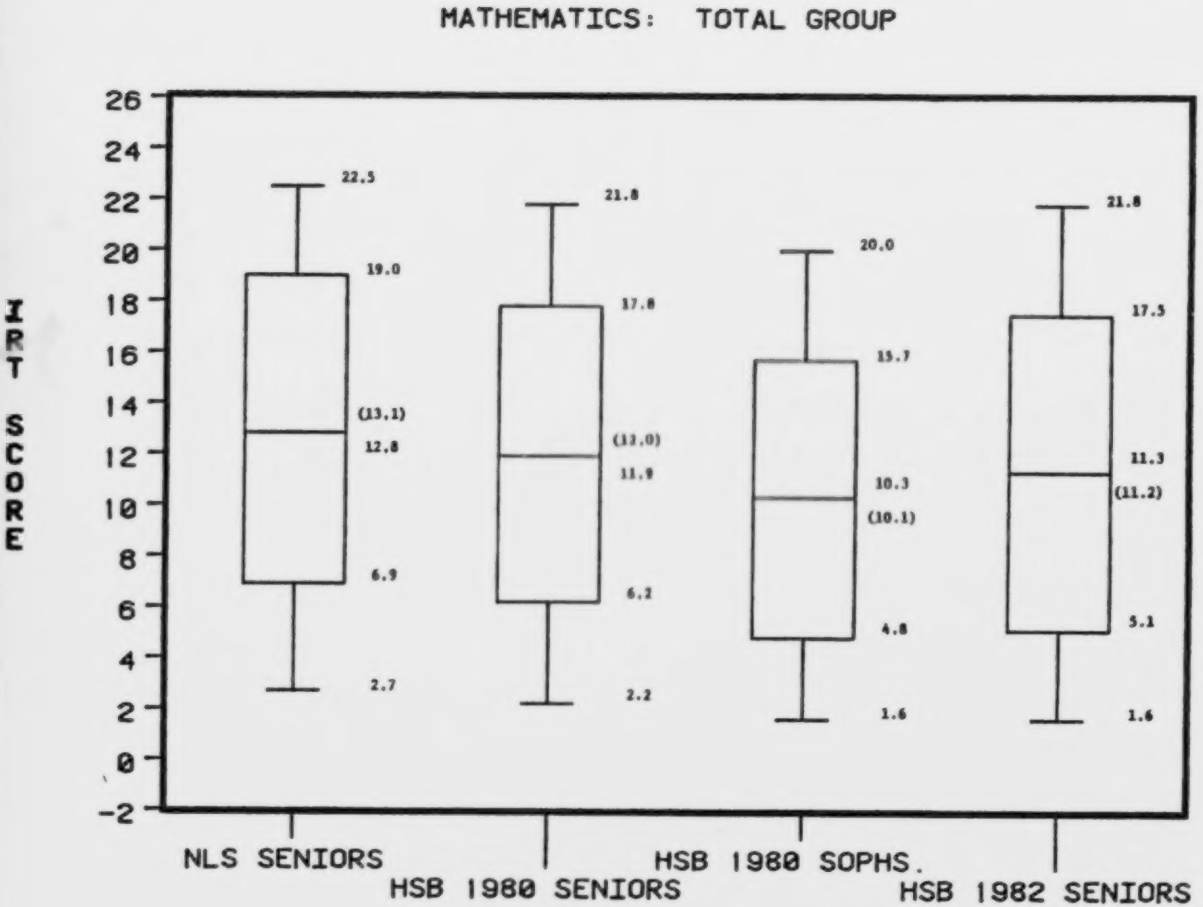

Figure 17
Mathematics: Total Group

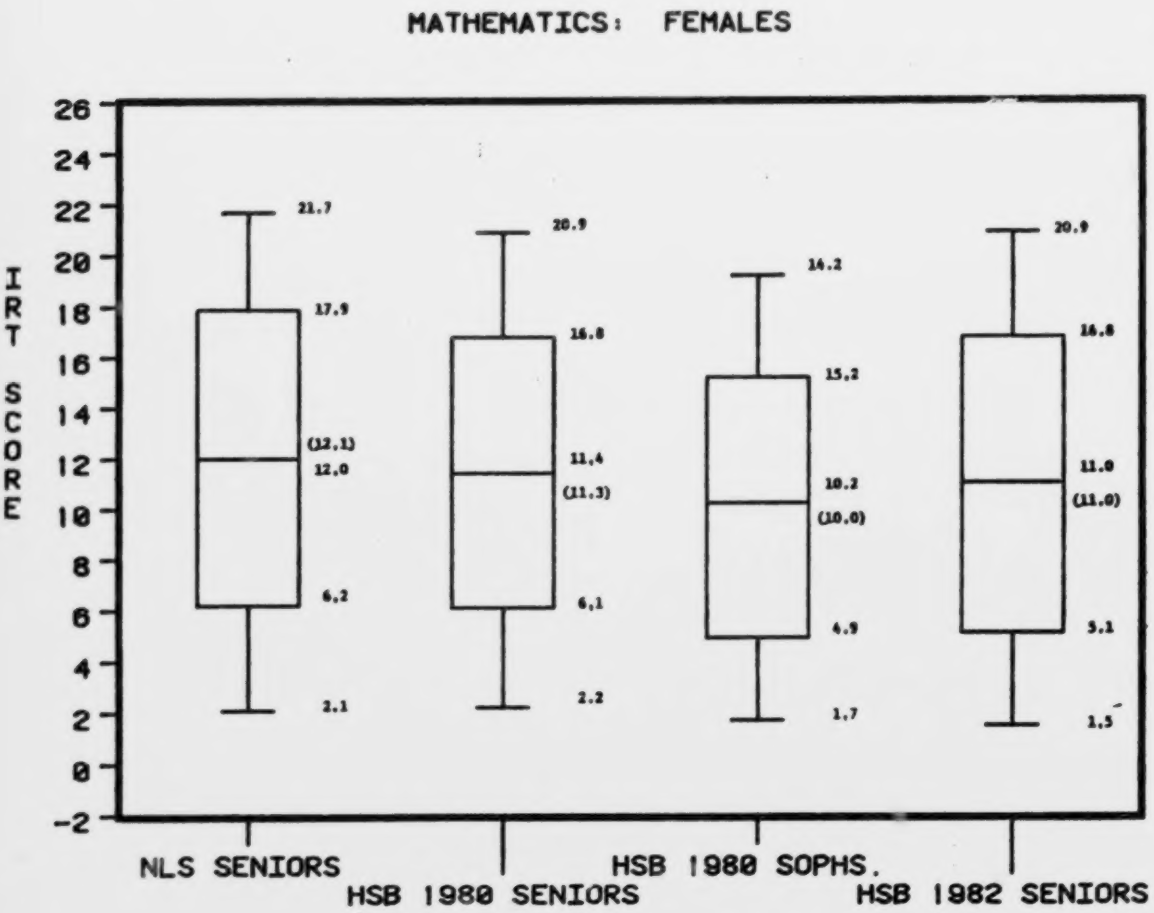

Figure 18
Mathematics: Females

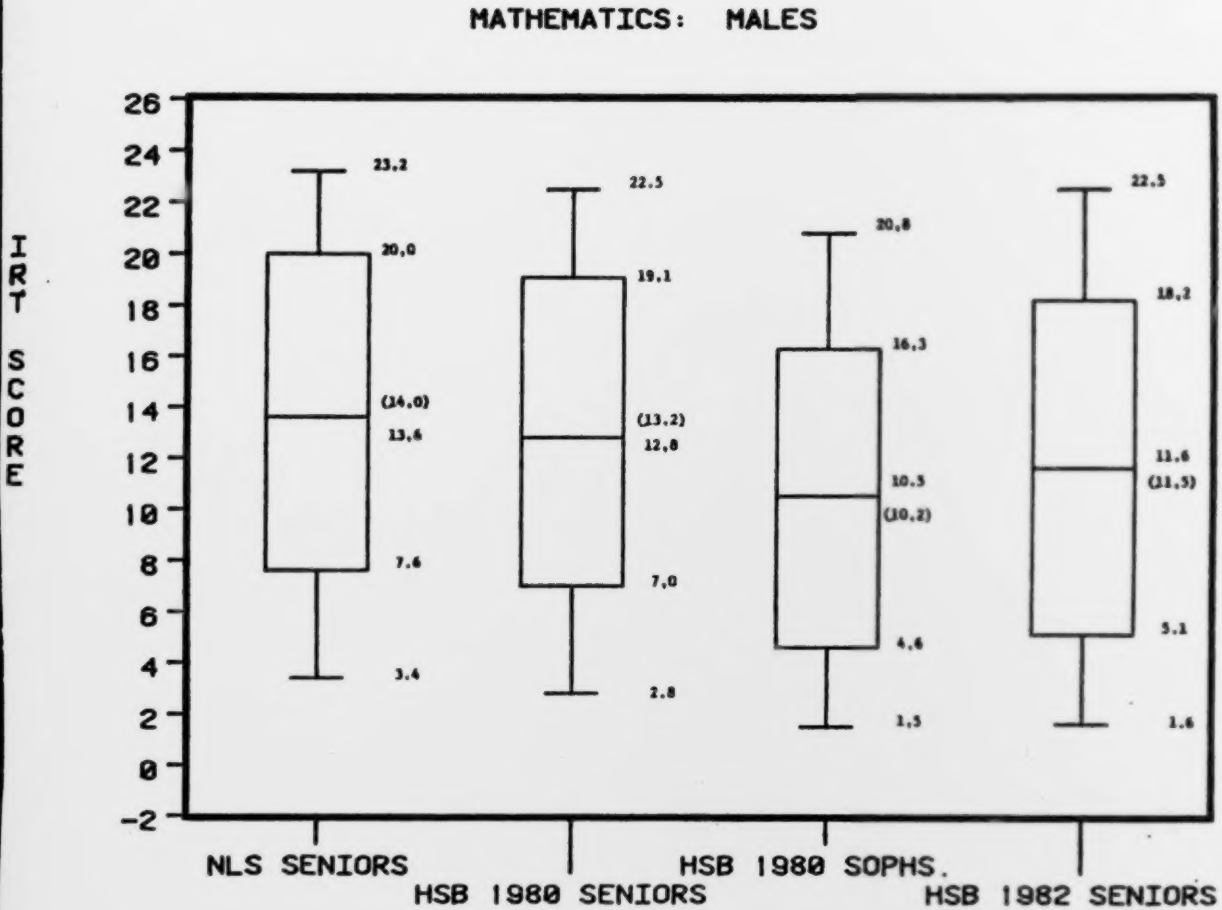

Figure 19
Mathematics: Males

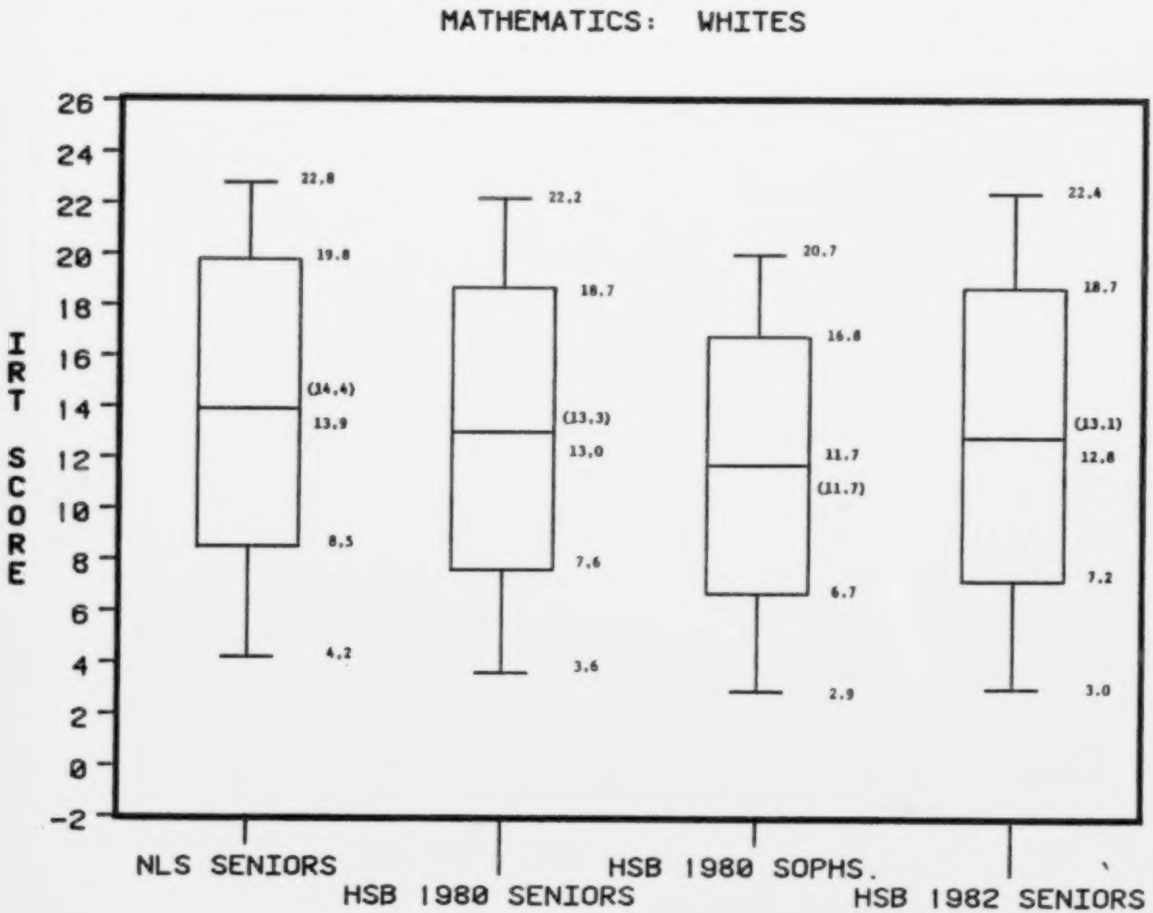

Figure 20
Mathematics: Whites

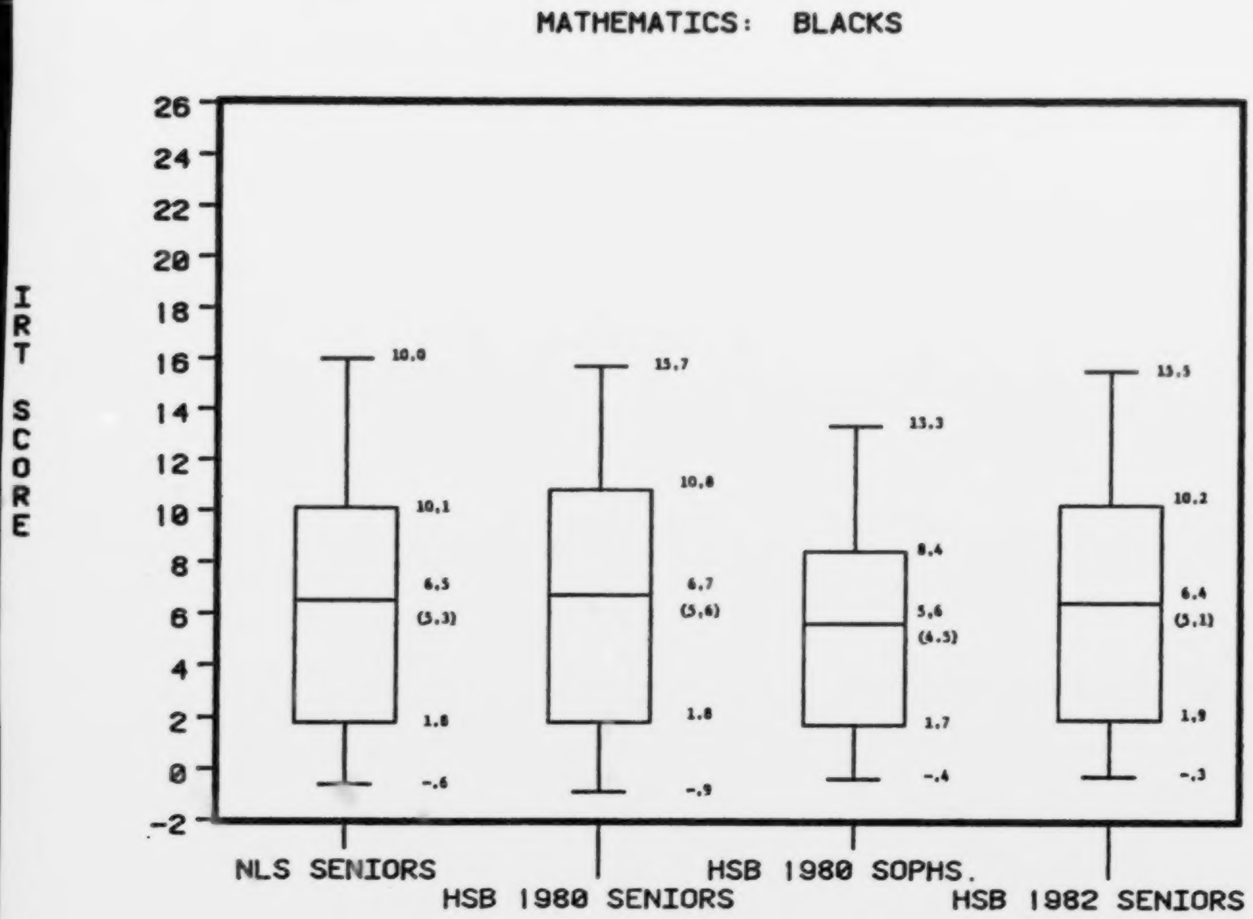

Figure 21
Mathematics: Blacks

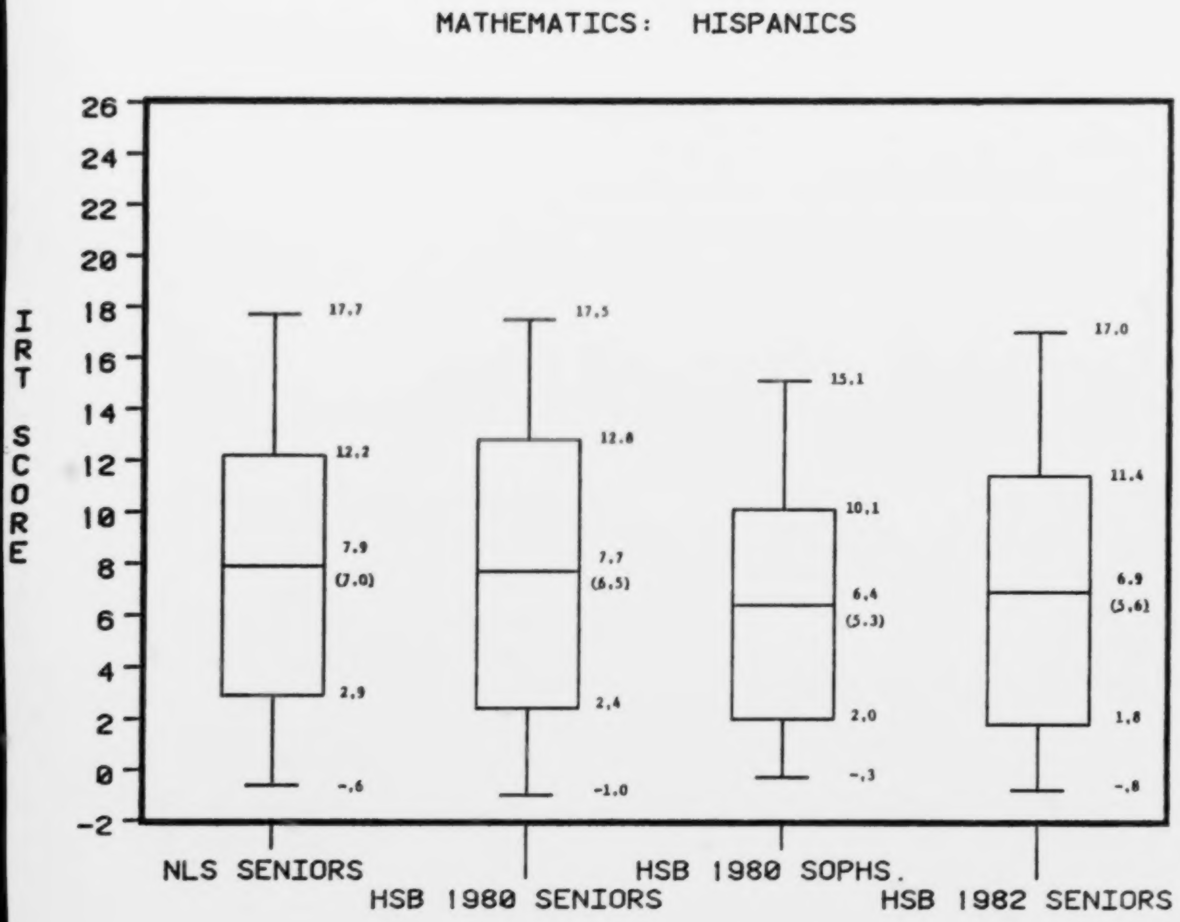

Figure 22
Mathematics: Hispanics

Table 20

NUMBER OF CASES USED TO CALCULATE
IRT SCORE STATISTICS ON SOPHOMORE COHORT TESTS

	HSB 1980 SOPHOMORES				HSB 1982 SENIORS			
	VOCABULARY	READING	MATH	SCIENCE	VOCABULARY	READING	MATH	SCIENCE
TOTAL GROUP	22813	22770	22770	22566	24094	23887	23700	23387
MALE	11086	11064	11065	10975	11828	11722	11648	11511
FEMALE	11727	11706	11705	11591	12266	12165	12052	11876
WHITE	15680	15647	15635	15540	16108	15960	15857	15666
BLACK	2772	2773	2775	2708	3121	3101	3066	3016
HISPANIC	3730	3721	3735	3698	4180	4145	4101	4043
WHITE MALE	7671	7656	7653	7611	7910	7836	7796	7713
WHITE FEMALE	8009	7991	7982	7929	8198	8124	8061	7953
BLACK MALE	1231	1231	1232	1204	1433	1423	1402	1380
BLACK FEMALE	1541	1542	1543	1504	1688	1678	1664	1636
HISPANIC MALE	1865	1859	1863	1847	2136	2116	2104	2078
HISPANIC FEMALE	1865	1862	1872	1851	2044	2029	1997	1965

NOTE: HSB 1980 SOPHOMORES WHO HAD DROPPED OUT OF SCHOOL BY THE TIME OF THE 1982 FOLLOWUP STATUS DETERMINATION WERE EXCLUDED FROM BOTH BASE YEAR AND FOLLOWUP TEST STATISTICS.

Table 21

IRT SCORE STATISTICS ON SOPHOMORE COHORT TESTS

VOCABULARY

	HSB 1980 SOPHOMORES				HSB 1982 SENIORS				
	MEAN	S.D.	SKEW-NESS	KURT-OSIS	MEAN	S.D.	SKEW-NESS	KURT-OSIS	GAIN (IN S.D. UNITS)
TOTAL GROUP	8.9	5.2	0.0	-0.8	10.9	5.6	-0.2	-0.8	0.38
MALE	9.1	5.1	0.0	-0.8	10.9	5.5	-0.2	-0.8	0.36
FEMALE	8.8	5.3	0.1	-0.8	10.8	5.7	-0.2	-0.9	0.40
WHITE	10.1	4.8	-0.1	-0.6	12.2	5.0	-0.4	-0.5	0.43
BLACK	4.9	4.5	0.8	0.1	6.7	5.2	0.5	-0.6	0.39
HISPANIC	5.8	4.7	0.5	-0.4	7.2	5.4	0.4	-0.7	0.31
WHITE MALE	10.2	4.7	-0.1	-0.6	12.2	5.0	-0.4	-0.5	0.41
WHITE FEMALE	10.0	4.9	-0.0	-0.7	12.2	5.1	-0.4	-0.5	0.45
BLACK MALE	5.5	4.5	0.7	-0.2	7.3	5.2	0.4	-0.7	0.40
BLACK FEMALE	4.4	4.5	1.0	0.5	6.2	5.1	0.6	-0.4	0.39
HISPANIC MALE	6.0	4.6	0.5	-0.4	7.3	5.3	0.4	-0.8	0.27
HISPANIC FEMALE	5.4	4.7	0.6	-0.5	7.1	5.5	0.4	-0.7	0.36

NOTES: 1) IRT SCORES HAVE BEEN ESTIMATED ON THE TEST ITEMS ACTUALLY ADMINISTERED TO THE SOPHOMORE COHORT.
2) STATISTICS ARE BASED ON WEIGHTED DATA.
3) HSB 1980 SOPHOMORES WHO HAD DROPPED OUT OF SCHOOL BY THE TIME OF THE 1982 FOLLOWUP STATUS DETERMINATION WERE EXCLUDED FROM BOTH BASE YEAR AND FOLLOWUP TEST STATISTICS.

systematic difference in the rate of gain for males and females.

Table 23 presents the results on changes in mathematics performance over the last two years of high school. The gap in mathematics performance between whites and other two ethnic groups continues to widen in terms of raw score points, if not in terms of standard deviation units. Similarly, the gap between males and females also shows a slight increase as one goes from sophomore to senior status. This increase in the gap between male-female math performance is not present for hispanic males and females. In fact, regardless of the achievement area, hispanic women show bigger gains in their last two years of high school than do their male counterparts.

Table 24 presents gains in the science area for totals as well as subpopulations. Similar to previous achievement areas, the white students show greater gains than do their minority counterparts. There is little difference between males and females with respect to relative gains with the exception (once again) of hispanic females. Hispanic females show a slight increase compared with hispanic males in raw score points and a somewhat greater increase in terms of standard deviation units.

When taking into consideration all four achievement areas, one would conclude:

1. The biggest gains over the two year schooling period were in vocabulary and reading. Gains in math and science were considerably smaller on average. On might wonder why the biggest gains occurred in an achievement area that would seem at first glance less curriculum-relevant. However, reading and vocabulary are central to achievement in all curriculum areas. Regardless of what curriculum one selects, one will have to practice his/her reading and vocabulary skills.

Table 22

IRT SCORE STATISTICS ON SOPHOMORE COHORT TESTS

READING

	HSB 1980 SOPHOMORES				HSB 1982 SENIORS				GAIN (IN S.D. UNITS)
	MEAN	S.D.	SKEW-NESS	KURT-OSIS	MEAN	S.D.	SKEW-NESS	KURT-OSIS	
TOTAL GROUP	7.0	4.7	0.3	-0.7	8.2	5.0	0.1	-0.9	0.25
MALE	7.1	4.8	0.2	-0.7	8.3	5.1	0.1	-0.9	0.25
FEMALE	7.0	4.7	0.3	-0.6	8.1	5.0	0.2	-0.9	0.25
WHITE	7.9	4.6	0.1	-0.7	9.2	4.9	-0.0	-0.8	0.27
BLACK	4.4	4.0	0.8	0.3	5.4	4.2	0.7	0.0	0.24
HISPANIC	4.3	4.1	0.8	0.4	5.4	4.5	0.7	-0.1	0.25
WHITE MALE	8.0	4.7	0.1	-0.7	9.3	5.0	-0.1	-0.8	0.27
WHITE FEMALE	7.8	4.6	0.2	-0.7	9.1	4.9	0.0	-0.9	0.27
BLACK MALE	4.5	4.1	0.8	0.3	5.8	4.3	0.5	-0.3	0.30
BLACK FEMALE	4.3	3.9	0.8	0.3	5.0	4.0	0.8	0.4	0.19
HISPANIC MALE	4.4	4.2	0.7	0.1	5.4	4.6	0.7	-0.2	0.22
HISPANIC FEMALE	4.2	3.8	0.9	0.7	5.4	4.4	0.7	0.0	0.30

NOTES: 1) IRT SCORES HAVE BEEN ESTIMATED ON THE TEST ITEMS ACTUALLY ADMINISTERED TO THE SOPHOMORE COHORT.
2) STATISTICS ARE BASED ON WEIGHTED DATA.
3) HSB 1980 SOPHOMORES WHO HAD DROPPED OUT OF SCHOOL BY THE TIME OF THE 1982 FOLLOWUP STATUS DETERMINATION WERE EXCLUDED FROM BOTH BASE YEAR AND FOLLOWUP TEST STATISTICS.

Table 23

IRT SCORE STATISTICS ON SOPHOMORE COHORT TESTS

MATHEMATICS

	HSB 1980 SOPHOMORES				HSB 1982 SENIORS				GAIN (IN S.D. UNITS)
	MEAN	S.D.	SKEWNESS	KURTOSIS	MEAN	S.D.	SKEWNESS	KURTOSIS	
TOTAL GROUP	13.2	9.7	0.3	-0.8	14.6	10.8	0.2	-1.0	0.15
MALE	13.5	10.3	0.3	-0.9	15.2	11.3	0.2	-1.0	0.17
FEMALE	12.8	9.2	0.2	-0.8	14.1	10.3	0.2	-0.9	0.14
WHITE	15.1	9.5	0.1	-0.8	16.8	10.4	0.0	-0.9	0.17
BLACK	6.4	7.4	1.0	0.8	7.6	8.4	0.9	0.3	0.17
HISPANIC	7.6	8.1	0.8	0.2	8.4	9.3	0.8	-0.1	0.10
WHITE MALE	15.6	10.0	0.1	-0.9	17.5	10.9	-0.0	-1.0	0.19
WHITE FEMALE	14.7	8.9	0.1	-0.7	16.1	9.9	0.0	-0.9	0.15
BLACK MALE	6.3	7.8	1.1	0.8	8.0	8.8	0.9	0.4	0.21
BLACK FEMALE	6.5	7.1	1.0	0.7	7.3	8.0	0.8	0.1	0.12
HISPANIC MALE	7.9	8.5	0.8	0.1	8.6	9.6	0.8	-0.1	0.08
HISPANIC FEMALE	7.2	7.6	0.9	0.3	8.1	8.9	0.8	-0.1	0.13

NOTES: 1) IRT SCORES HAVE BEEN ESTIMATED ON THE TEST ITEMS ACTUALLY ADMINISTERED TO THE SOPHOMORE COHORT.
2) STATISTICS ARE BASED ON WEIGHTED DATA.
3) HSB 1980 SOPHOMORES WHO HAD DROPPED OUT OF SCHOOL BY THE TIME OF THE 1982 FOLLOWUP STATUS DETERMINATION WERE EXCLUDED FROM BOTH BASE YEAR AND FOLLOWUP TEST STATISTICS.

Table 24

IRT SCORE STATISTICS ON SOPHOMORE COHORT TESTS

SCIENCE

	HSB 1980 SOPHOMORES				HSB 1982 SENIORS				
	MEAN	S.D.	SKEWNESS	KURTOSIS	MEAN	S.D.	SKEWNESS	KURTOSIS	GAIN (IN S.D. UNITS)
TOTAL GROUP	9.1	4.5	-0.1	-0.6	9.9	4.6	-0.2	-0.6	0.17
MALE	9.8	4.6	-0.3	-0.5	10.6	4.7	-0.4	-0.5	0.17
FEMALE	8.5	4.3	-0.1	-0.6	9.3	4.4	-0.1	-0.7	0.18
WHITE	10.2	4.1	-0.2	-0.3	11.0	4.2	-0.4	-0.3	0.20
BLACK	5.4	3.9	0.6	0.1	6.1	3.9	0.6	-0.1	0.18
HISPANIC	6.4	4.2	0.4	-0.5	7.0	4.5	0.2	-0.7	0.15
WHITE MALE	10.9	4.1	-0.4	-0.2	11.7	4.2	-0.5	-0.0	0.20
WHITE FEMALE	9.6	3.9	-0.2	-0.4	10.3	4.0	-0.3	-0.4	0.19
BLACK MALE	6.1	4.2	0.5	-0.2	6.9	4.2	0.4	-0.5	0.20
BLACK FEMALE	4.9	3.5	0.6	0.2	5.5	3.6	0.7	0.2	0.17
HISPANIC MALE	7.0	4.4	0.2	-0.5	7.4	4.6	0.1	-0.7	0.10
HISPANIC FEMALE	5.7	3.9	0.5	-0.4	6.6	4.3	0.3	-0.6	0.22

NOTES: 1) IRT SCORES HAVE BEEN ESTIMATED ON THE TEST ITEMS ACTUALLY ADMINISTERED TO THE SOPHOMORE COHORT.
2) STATISTICS ARE BASED ON WEIGHTED DATA.
3) HSB 1980 SOPHOMORES WHO HAD DROPPED OUT OF SCHOOL BY THE TIME OF THE 1982 FOLLOWUP STATUS DETERMINATION WERE EXCLUDED FROM BOTH BASE YEAR AND FOLLOWUP TEST STATISTICS.

Conversely, improvement in science and mathematics skills, as measured by the HS&B tests, are much more likely to be affected by choice of curriculum than to act as a by-product of general schooling.

2. Whites tended to show greater gains than did either of the other ethnic groups. This differential gain was more pronounced when whites were compared with hispanics.
3. There was a consistent tendency for hispanic women to show greater gains than hispanic men. This may reflect curriculum differences as well as a differential drop-out rate. That is, lower scoring hispanic males may be more likely to stay in school than are their female counterparts.
4. There is a consistent tendency for the test score variance to increase as one goes from the sophomore to senior year. This increase is the normal expectation when an educational treatment is applied.

Initial Comparisons of IRT Scale Scores with Observed Formula Scores

The greatest potential benefit from IRT scaling is the ability to estimate how 1980 and 1982 seniors would score if they took the 1972 test battery. Unfortunately, one cannot compare the IRT results with, say, formula score results for the cross-sectional comparisons, since the observed formula score results would be unobtainable. Comparisons, however, can be made between formula scores and IRT scaled scores for the longitudinal sophomore-senior cohort. However, since in the longitudinal analysis, the same tests were administered to the same people on two occasions, the advantages of IRT scaling is less clear. In the case of mean changes, the IRT formula corrected scale score means for the total population will be identical to the raw formula scored means since the "true" score mean is equal to the observed mean. Slight differences between the observed means and the formula corrected number right true score (NRTS) means might occur within some subgroups. However, these mean differences will be negligible. In theory the variance of NRTS should be somewhat less than the observed formula score variances. This follows from the fact that the true score variance should be less than the observed formula score variance. At the same time, however, there is always an error in estimation of the NRTS's that may inflate the variance of the estimated NRTS's. The end result, with respect to the longitudinal data, is that NRTS and formula scored means are identical for sophomore and seniors, but the NRTS variances are generally equal to or slightly smaller than the observed formula scored variances. Thus, when one looks at mean changes in standard deviation units, the difference in some cases will be larger for NRTS scores.

Although NRTS would be expected to have little or no effect (from test theory assumption) on estimation of means, it was hoped that optimal item scoring weights might increase the differentiation between individuals (especially in the center of the distribution) and thereby increase the correlation with external variables. The NRTS scores tend to pull in extreme scores but increase the differentiation in the middle. Table 25 presents correlations between individual IRT gains (1982 NRTS - 1980 NRTS) with base year NRTS scores, base year SES, and whether or not the individual was in the academic curriculum. The last three columns show the same analysis for observed formula scores.

Table 25 suggests that the IRT scale scores lead to some improvement in the gain score correlations. With the exception of the writing test sophomore status, NRTS scores tend to have a less negative relationship with gains than do the observed formula scores. There is, however, almost no difference between the two scoring methods with respect to the correlation with SES and academic curriculum.

Overall the psychometric analysis suggests that:

- Differences in test administrations in 1972 and 1980, primarily a change in answer sheet format, lead to more items being attempted in 1980 than in 1972. It is argued that item response theory being used here may substantially reduce the impact of any effects to this change in administration.
- The test batteries appear to be measuring the same things with the same precision across ethnic and sex groups. Similarly, the 1980 sophomore test batteries factor structure did not change when it was re-administered to the same sophomores two years later. The critical

finding here is that we can be reasonably confident that any comparisons of test scores at two points in time are valid measures of change along the same dimension.

The tests were at the appropriate difficulty level and the 1980 sophomore cohort battery was sufficient so that gains could be a reasonable expectation.

Table 25

Correlations of Test Score Gains (1980 to 1982) with Initial Status, SES, and Academic Curriculum

	Raw Gain in IRT Scores			Raw Gain in Formula Scores		
	With Base Year Score	With Base Year SES	With Academic Curriculum	With Base Year Score	With Base Year SES	With Academic Curriculum
VOCABULARY	-.18	.05	.05	-.23	.05	.04
READING	-.28	.04	.05	-.28	.05	.05
MATH	-.10	.10	.11	-.14	.09	.10
SCIENCE	-.31	.04	.02	-.34	.02	.02
WRITING	-.36	.00	-.01	-.35	.00	.00

Summary

Item analysis statistics were computed for all tests in the 1972 and 1980 senior, and 1980 sophomore and 1982 senior administrations. The purpose of the item analysis was to investigate whether (1) the tests were at the appropriate difficulty level, (2) the 1980 sophomore cohort battery had sufficient "ceiling" so that gains could be a reasonable expectation, and (3) the tests, with the possible exception of the civics test, had sufficient reliability to support reasonably accurate estimation of mean changes and changes in individual rank ordering over time.

The results of the item analysis suggest that the tests were slightly more difficult than would be indicated by measurement theory. However, since the NLS and HS&B populations are characterized by considerable diversity in ability, one has to consider the tradeoff between having a test that may be on the easy side, and, as a result, suffer from possible ceiling effects for some subpopulations. The item analysis results suggest a reasonable compromise was made.

With respect to reliability, there is little in the way of changes in reliability or standard errors of measurement (SEM's) when comparing NLS 1972 seniors with 1980 HS&B seniors. However, in the longitudinal comparison, there is a consistant gain in the reliabilities of the total test scores as one goes from the sophomore to senior year.

Similar gains in reliability were found for all the subtests, with the exception of the biology subtest. It is suggested that future science score gains might be computed two ways--one with the biology items included and one with them excluded.

Although the reliabilities were lower for blacks and hispanics when compared with whites, the standard errors of measurement were about the same, suggesting the precision of measurement was about the same for all racial groups.

Of the total test scores, only the civics test was of sufficiently low reliability to question its use in any individual change score analysis. The subtests for the most part are not sufficiently reliable to justify their use as measures of change in individual rank ordering.

Confirmatory factor analysis was conducted to determine what the tests are and are not measuring; and whether what is being measured is the same across cohorts and selected subpopulations within cohorts. The factor analysis was carried out on rationally derived subtest "parcels" whose homogeneity was verified in the above reliability analysis.

The factor analysis results suggested that there is little if any change in factor structure either cross-sectionally (i.e., when comparing 1972 and 1980 senior cohorts), or in the longitudinal comparison of sophomores with seniors. With the exception of the writing style, punctuation parcels, and the physics parcel, the remaining subtest parcels seem to possess little or no unique reliable variance beyond that which can be explained by a verbal and/or math factor. Black and hispanic factor structures are quite similar to white structures with the exception that performance on the science measures has a larger verbal component for hispanics than for whites. One somewhat surprising result is that there is no increased differentiation between the verbal and math factors when going from sophomore to senior status (as measured by the factor intercorrelation). However, there is increased differentiation between individuals (as measured by increased test score variance) as the transition from sophomore to senior occurs. It is possible that additional achievement factors and factor differentiation would emerge if populations were defined by curriculum. Individuals in the academic curriculum would be more likely to take additional specialized courses in areas of particular interest or skill. This should lead to more differentiation. In sum, there is little empirical evidence for the notion that the tests or test parcels measure different things for different ethnic or sex groups.

Item Response Theory (IRT) was used to score tests within populations (1980-1982), and to score and equate tests across populations. IRT methods were used to put mathematics, vocabulary, and reading scores on the same scale for 1972, 1980, and 1982 seniors. Similarly, IRT methods were used to score all the HS&B tests given to individuals as Sophmores and repeated as seniors. The three parameter IRT model was selected over the one and two parameter models because of the possibility that guessing and/or speededness might be additional confounding sources of variance. The IRT analysis allowed one to compare how 1980 and 1982 seniors would score if they took the 1972 vocabulary, reading, and mathematics tests.

The results of the cross-sectional IRT equating suggest there is a continued decline in reading and mathematics scores from 1972, 1980, to 1982 in both the total senior population and sex and race groups. Vocabulary scores declined from 1972 to 1980, but they seemed to level off between seniors in 1980 and 1982 in the total groups. Although the vocabulary decline appears to be arrested in the total group, both blacks and hispanics continue to show some decline between seniors in 1980 and 1982.

The results of the sophomore-senior longitudinal test score gains analysis using IRT scales suggested:

1. The biggest gains over the two-year schooling period were in vocabulary and reading. Gains in math and science were considerably smaller on average. One might wonder why the biggest gains occurred in an

achievement area that would seem at first glance less curriculum-relevant than the others. However, reading and vocabulary are central to achievement in all curriculum areas. Regardless of what curriculum one selects, one will have to use reading and vocabulary skills. Conversely, improvement in science and mathematic skills, as measured by the HS&B tests, are much more likely to be affected by choice of curriculum than to act as a by-product of general schooling.

2. Whites tended to show greater gains than did either of the other ethnic groups. This differential gain was more pronounced when whites were compared with hispanics.
3. There was a consistent tendency for hispanic women to show greater gains than hispanic men. This may reflect curriculum differences as well as a differential drop out rate. That is, lower scoring hispanic males may be more likely to stay in school than are their female counterparts.
4. There is a consistent tendency for the test score variance to increase as one goes from the sophomore to senior year. This increase is the normal expectation when an educational treatment is applied.

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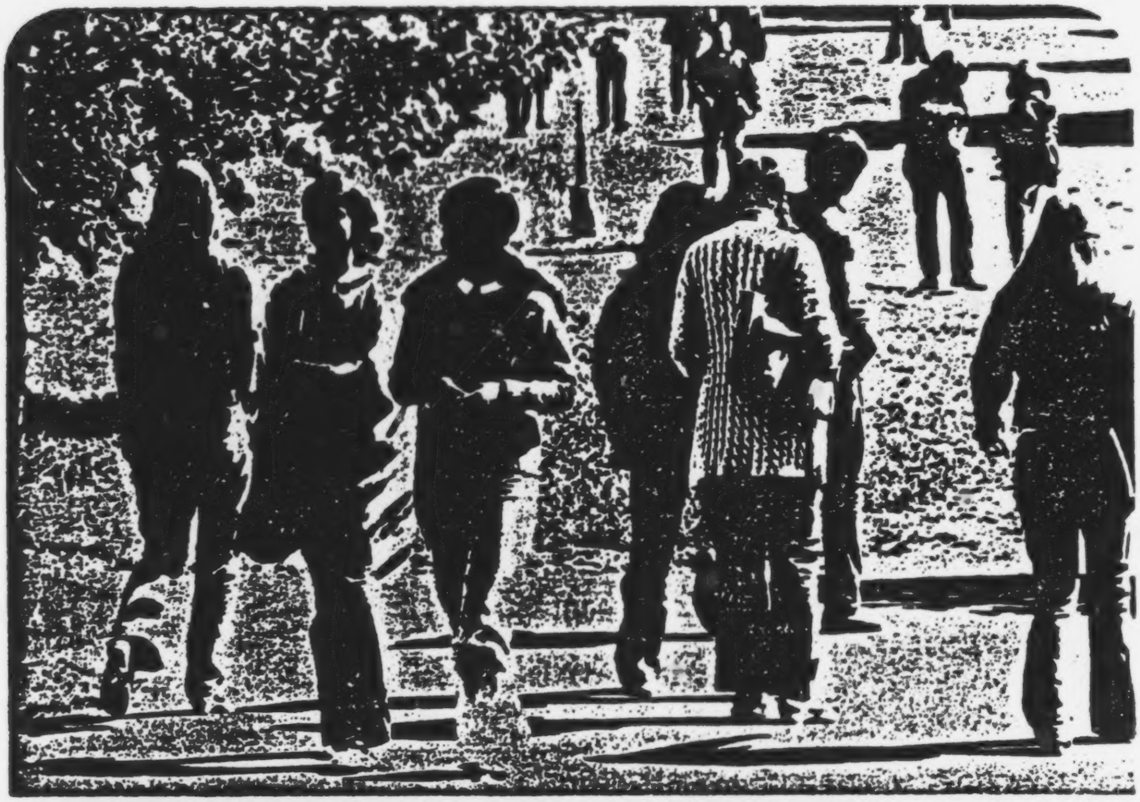
APPENDIX A

A1 Student Test Booklet

A2 Senior Test Booklet

A3 Sophomore Test Booklet

A-1



NATIONAL LONGITUDINAL STUDY OF THE HIGH SCHOOL CLASS OF 1972

Student Test Book

'72

Prepared for the
UNITED STATES OFFICE OF EDUCATION
BY EDUCATIONAL TESTING SERVICE □ PRINCETON, NEW JERSEY
SPRING 1972

OE FORM NO. 2348-5, 2-72 COPYRIGHT © 1962, 1963, 1967, 1968, 1969, 1970 BY EDUCATIONAL TESTING SERVICE. ALL RIGHTS RESERVED.

GENERAL DIRECTIONS

This test has six sections. Some sections have more than one part. During the time allowed for each section or part, you are to work only on it. The time limit for each section or separately timed part is printed at the beginning of each section or part, and the supervisor will tell you when to begin and when to stop. If you finish a section or part before time is called, go back and check your work on that section or part only.

Your score on each section will be the number of correct answers minus a percentage of the number of incorrect answers. Therefore, it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices.

Mark all of your answers on the separate answer sheet, as no credit will be given for anything written in the test book. Make your marks on the answer sheet heavy and black, as in the examples below.

Sample Answers

■ B C D E

A B C ■ E

Be sure that the entire box is blackened.

If you wish to change an answer, erase your first mark completely.

CONTENTS OF TEST BOOK

Section 1	Vocabulary	5 minutes
Section 2	Picture-Number (Two parts of 5 minutes each)	10 minutes
Section 3	Reading	15 minutes
Section 4	Letter Groups	15 minutes
Section 5	Mathematics	15 minutes
Section 6	Mosaic Comparisons (Three parts of 3 minutes each)	9 minutes
Total		69 minutes

SECTION 1

VOCABULARY

Time—5 minutes

__Directions:__ Each of the questions below consists of one word followed by five words or phrases. You are to select the one word or phrase whose meaning is closest to that of the word in capital letters.

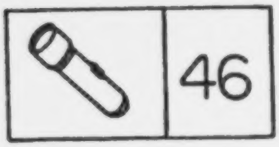
__Sample Question__	__Sample Answer__
CHILLY: (A) lazy (B) nice (C) dry (D) cold (E) sunny	[A] [B] [C] ■ [E]

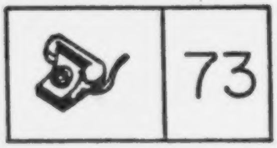
In order to find the correct answer you look at the word __chilly__ and then look for a word below it that has the same or almost the same meaning. When you do this, you see that __cold__ is the answer because __cold__ is closest in meaning to the word __chilly__.

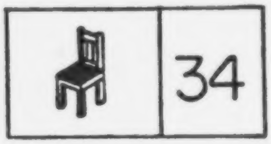
SECTION 2

PICTURE—NUMBER

__Directions:__ This is a test of your ability to remember picture-number combinations. The section has two parts. In each part you will study a page of fifteen pictures with numbers. On a study page the picture-number pairs will look like this:







After studying the page showing both pictures and numbers, you will be told to turn to a page showing the pictures in a different order.

On your answer sheet there are ten boxes with numbers above them for each question. One of the numbers will be the number that goes with the picture. You are to blacken the box with that number above it.

	12	24	31	44	51	57	65	73	77	92
Examples: 1.	☐	☐	☐	☐	☐	☐	☐	■	☐	☐
	15	27	34	41	46	55	62	75	82	89
2.	☐	☐	■	☐	☐	☐	☐	☐	☐	☐
	13	19	28	34	46	58	62	67	73	97
3.	☐	☐	☐	☐	■	☐	☐	☐	☐	☐

The number that goes with the picture of a telephone is 73, so for example 1 you would blacken the box with 73 above it. For example 2 you would blacken the box with 34 above it. For example 3 you would blacken the box with 46 above it.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

-15- 3

SECTION 3
READING
Time—15 minutes

Directions: Each passage is followed by questions based on its content. After reading a passage, choose the best answer to each question and blacken the corresponding space on the answer sheet. Answer all questions following a passage on the basis of what is stated or implied in that passage.

(The items consisted of reading passages of approximately 100 words followed by 3, 4, or 5 items each of which had 5 options)

-19- 4

SECTION 4
LETTER GROUPS

Directions: Each question in this section consists of five groups of letters with four letters in each group. Four of the groups have a characteristic in common which the fifth group does not have. Decide which group is different, and blacken the space on the answer sheet that corresponds to the position (A, B, C, D, or E) of your choice.

Note: The common characteristic will not be based on the sounds of groups of letters, the shapes of letters, or whether letter combinations form words or parts of words.

Sample Questions						Sample Answers
	A	B	C	D	E	
1.	NOPQ	DEFL	ABCD	HIJK	UVWX	1. A ■ C D E
2.	NLIK	PLIK	QLIK	THIK	VLIK	2. A B C ■ E

In sample question 1, the letters in four of the groups are in consecutive alphabetical order, but group DEFL in column B is not; so space B has been marked in the sample answers. In sample question 2, four of the groups contain the letter L. Letter group THIK in column D is the group that is different, so space D has been marked in the sample answers.

You will have 15 minutes to work on this section.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

SECTION 5

MATHEMATICS

Directions: Each problem in this section consists of two quantities, one placed in Column A and one in Column B. You are to compare the two quantities and on the answer sheet blacken space

- A if the quantity in Column A is greater;
- B if the quantity in Column B is greater;
- C if the two quantities are equal;
- D if the size relationship cannot be determined from the information given.

	Sample Questions		Sample Answers
	Column A	Column B	
Example 1.	20 per cent of 10	10 per cent of 20	1. [A] [B] ■ [D]
Example 2.	6 × 6	12 + 12	2. ■ [B] [C] [D]

Answer C is marked in Example 1 since the quantity in Column A is equal to the quantity in Column B. Answer A is marked for Example 2 since the quantity in Column A is greater than the quantity in Column B.

You will have 15 minutes to work on this section.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

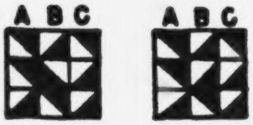
SECTION 6

MOSAIC COMPARISONS

Directions: This test consists of pairs of mosaics, that is, patterns of squares like those found on tiled floors or walls. Each mosaic is made up of a number of partially shaded squares. The mosaics in each pair are identical except for one square which differs in shading. The vertical columns of both mosaics are labeled A to C, A to D, or A to E according to the number of columns in the mosaic. Your task will be to locate, for each pair of mosaics, the column that contains the single square which is shaded differently. Then mark the space on your separate answer sheet that corresponds to the letter at the head of that column.

Sample Question

1.



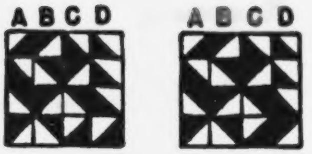
Sample Answer

1. A ■ C

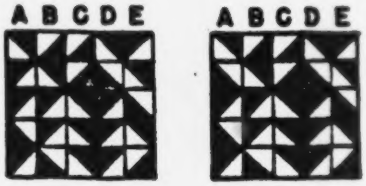
In sample question 1, the right-hand and left-hand mosaics are identical except for the center square of column B, so answer space B is blackened in the sample answer.

Sample Questions

2.



3.



Sample Answers

2. A B C ■

3. ■ B C D E

In sample question 2, the bottom square in column D is the one that is different, so answer space D is blackened in the sample answers. In sample question 3, the second square in column A is the one that is different, so answer space A is blackened in the sample answers.

There are three parts to this test. All the mosaics in a single part are the same size. During the three minutes allowed for each part, you are to work on that part only. Do not move ahead to the next part until you are told to do so. Remember only one square is different for each pair of mosaics.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

SR/T 4278
1980

A-2
(Note: examples are given only of
item types not used in the 1972
test battery)

SENIOR TEST BOOKLET

High School and Beyond is sponsored by the National Center for Education Statistics, an agency of the United States Department of Education.

There are several kinds of tests in this booklet. Each test is timed and has its own instructions. You will be given time to read the instructions before you begin work on the test.

You've probably taken tests like these before, but this time no one in your school will see your test results. The important thing about these tests is that you will be representing thousands of other students like yourself. Your individual answers will be regarded as strictly confidential. They will be combined with answers from other students and will never be identified as yours. Your participation is voluntary.

STOP! DO NOT OPEN THIS BOOKLET
UNTIL YOU ARE TOLD TO DO SO.

STATE:

SCHOOL NO:

STUDENT NO:

Prepared for the National
Center for Education
Statistics by the
Educational Testing Service
NCES Form 2409-12

GENERAL DIRECTIONS

12th Grade

This test has seven sections, and two sections have two parts. During the time allowed for each section or part, you are to work only on it. The time limit for each section or part is printed at the beginning of the section or part and the supervisor will tell you when to begin and when to stop. If you finish before time is called, go back and check your work on that section or part only.

Your score on each section except Sections 6 and 7 will be the number of correct answers minus a percentage of the number of incorrect answers. Therefore, on Sections 1 through 5 it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices.

Mark all of your answers by filling in the oval next to the appropriate answer.

Use only the lead pencil you have been given.

Make heavy black marks inside the ovals.

Be sure that the entire oval is blackened.

If you wish to change an answer, erase your first mark completely.

This kind of mark will work:

These marks will NOT work:

CONTENTS OF TEST BOOK

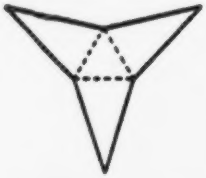
Section 1	Vocabulary	
	Part 1	5 minutes
	Part 2	4 minutes
Section 2	Reading	15 minutes
Section 3	Mathematics	
	Part 1	15 minutes
	Part 2	4 minutes
Section 4	Picture-Number	5 minutes
Section 5	Mosaic Comparisons	
	Part 1	3 minutes
	Part 2	3 minutes
Section 6	Visualization in Three Dimensions	9 minutes
Section 7	Questions About Testing	5 minutes

SECTION 6
VISUALIZATION IN THREE DIMENSIONS
Time--9 minutes

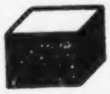
Directions: Each problem in this test has a drawing of a flat piece of metal at the left. At the right are shown five objects, only one of which might be made by folding the flat piece of metal along the dotted line. You are to pick out the one of these five objects which shows just how the piece of flat metal will look when it is folded at the dotted lines. When it is folded, no piece of metal overlaps any other piece, or is enclosed inside the object. On this test your score will be the number of correct answers.

Now look at example 1 below.

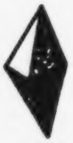
Example 1:



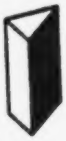
Sample Question



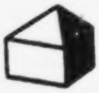
Ⓐ



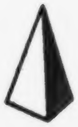
Ⓑ



Ⓒ



Ⓓ



●

Of the five objects shown, only E could be made from the flat piece shown at the left by folding it at each of the dotted lines. E shows how the flat piece would look after being folded. Therefore, oval E would be marked.

Remember, all folds are indicated by dotted lines; the solid lines show the cuts in the piece, and parts are not folded inside of other parts of any objects (in other words, there is no overlapping).

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

SECTION 7
QUESTIONS ABOUT THE TESTS

Time—5 minutes

Now that you have completed the tests, we would appreciate your telling us how you felt about taking them. The information you fill in will help us to understand better how tests should or should not be used in high schools. We would like to know your own views and reactions; your responses will not affect your test scores in any way and will be treated as confidential information.

1. Today you have taken six tests that were intended to measure different abilities or areas of knowledge. These areas are:

- **a. Vocabulary**
- **b. Reading**
- **c. Mathematics**
- **d. Picture-Number**
- **e. Mosaic Comparisons**
- **f. Visualization in Three Dimensions**

How important do you think each of these six abilities will be to you in your own future? For each test in the list below, please mark oval A, B, C, or D. Make one mark for each test.

	Of little importance	Fairly important	Very important	Don't know
Vocabulary and Reading Tests	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Mathematics Test	Ⓐ	Ⓑ	Ⓒ	Ⓓ
Picture-Number, Mosaic Comparisons, and Visualization in Three Dimensions	Ⓐ	Ⓑ	Ⓒ	Ⓓ

2. How concerned were you about doing very well on these tests? Mark one.

Ⓐ Not concerned at all
Ⓑ Only slightly concerned
Ⓒ Somewhat concerned
Ⓓ Very concerned

3. How much did you enjoy taking the tests? Mark one.

Ⓐ Not at all
Ⓑ Only to a limited degree
Ⓒ Somewhat
Ⓓ A great deal

4. On the whole, how well do you think your scores on the six tests will show your real ability? Mark one.

Ⓐ My real ability is probably higher than my scores will show.
Ⓑ My scores will probably be about right.
Ⓒ My real ability is probably lower than my scores will show.

GO ON TO THE NEXT PAGE.

5. How did you feel while you were taking the tests? Please mark YES or NO after each word or phrase.

		YES	NO
a.	Calm	○	○
b.	Interested in the tests	○	○
c.	Distracted by things going on in the room	○	○
d.	Afraid of not doing well	○	○
e.	Bored	○	○
f.	Eager to do my very best	○	○
g.	Angry or annoyed	○	○
h.	Under a lot of pressure	○	○
i.	Involved in taking the tests	○	○
j.	Under a lot of strain to do well	○	○
k.	Able to concentrate well on the tests	○	○
l.	Uneasy	○	○
m.	Uncomfortable	○	○
n.	Distracted by noises outside	○	○
o.	Confident in myself	○	○
p.	Rather tired	○	○
q.	Feeling that the tests don't matter much	○	○
r.	Often thinking about something else	○	○
s.	Very tense	○	○
t.	Nervous or jittery	○	○

6. If you would like to add any comments or explain any of your answers to these questions about testing, please use the space below:

A-3

SOPHOMORE TEST BOOKLET

HIGH SCHOOL AND BEYOND

High School and Beyond is sponsored by the National Center for Education Statistics, an agency of the United States Department of Education.

There are several kinds of tests in this booklet. Each test is timed and has its own instructions. You will be given time to read the instructions before you begin work on the test.

You've probably taken tests like these before, but this time no one in your school will see your test results. The important thing about these tests is that you will be representing thousands of other students like yourself. Your individual answers will be regarded as strictly confidential. They will be combined with answers from other students and will never be identified as yours. Your participation is voluntary.

STOP! DO NOT OPEN THIS BOOKLET
UNTIL YOU ARE TOLD TO DO SO.

STATE: WI

SCHOOL NO: 05424

STUDENT NO: 16

Prepared for the National
Center for Education
Statistics by the
Educational Testing Service
NCES Form 2409-11

GENERAL DIRECTIONS

10th Grade

This test has six sections, and one section has two parts. During the time allowed for each section or part, you are to work only on it. The time limit for each section or part is printed at the beginning of the section or part, and the supervisor will tell you when to begin and when to stop. If you finish a section or part before time is called, go back and check your work on that section or part only.

Your score on each section will be the number of correct answers minus a percentage of the number of incorrect answers. Therefore, it will not be to your advantage to guess unless you are able to eliminate one or more of the answer choices.

Answer each question by marking one of the answer ovals as no credit will be given for anything written elsewhere in the test book.

Use only the lead pencil you have been given.

Make heavy black marks inside the ovals.

Be sure that the entire oval is blackened.

If you wish to change an answer, erase your first mark completely.

This kind of mark will work:
Ⓐ Ⓑ ● Ⓓ

These marks will NOT work:
⊘ ✓ Ⓒ ◑

CONTENTS OF TEST BOOK

Section 1	Vocabulary	7 minutes
Section 2	Reading	15 minutes
Section 3	Mathematics	
	Part 1	16 minutes
	Part 2	5 minutes
Section 4	Science	10 minutes
Section 5	Writing	10 minutes
Section 6	Civics Education	5 minutes

(Note: In the following pages, examples are given only of item types not used in the 1972 or 1980 tests)

SECTION 4
SCIENCE
Time—10 minutes
20 Questions

DIRECTIONS: Carefully read each question and any material that relates to it. Then, choose the best answer and blacken the corresponding oval.

(No sample was given. Actual items have five options.)

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

SECTION 5
WRITING
Time—10 minutes
17 Questions

Directions Carefully read each question and any material that relates to it. Then, choose the best answer and blacken the corresponding oval.

Sample Question

For Example Question find the error in punctuation or capitalization. There is only one error.

Example. All of the letters_magazines, and_newspapers on his desk were dated
A B
July_18,_1969.
C D

The correct answer to this question is A because a comma should be placed after "letters."

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

SECTION 6
CIVICS EDUCATION
Time—5 minutes
10 Questions

Directions: Carefully read each question and any material that relates to it. Then, choose the best answer and blacken the corresponding oval.

(No example was given. Actual items have four options.)

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

APPENDIX B

NLS Item Analysis Tables

B1 1972 Vocabulary Male-Female

B2 1972 Vocabulary White-Black-Hispanic

B3 1972 Vocabulary White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

B4 1972 Reading Male-Female

B5 1972 Reading White-Black-Hispanic

B6 1972 Reading White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

B7 1972 Reading White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

B8 1972 Math Male-Female

B9 1972 Math White-Black-Hispanic

B10 1972 Math White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

B11 1972 Letter Groups Male-Female

B12 1972 Letter Groups White-Black-Hispanic

B13 1972 Letter Groups White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

B1

NLS 1972
VCCABULARY

	MALE			FEMALE			TOTAL		
	P+	PBIS	DELTA	P+	PBIS	DELTA	P+	PBIS	DELTA
ITEM 1	0.89	0.69	8.1	0.89	0.65	8.1	0.89	0.67	8.1
ITEM 2	0.45	0.73	13.5	0.59	0.75	12.1	0.52	0.74	12.8
ITEM 3	0.73	0.73	10.6	0.80	0.75	9.7	0.76	0.74	10.2
ITEM 4	0.64	0.71	11.6	0.62	0.72	11.8	0.63	0.71	11.7
ITEM 5	0.85	0.70	8.9	0.83	0.69	9.2	0.84	0.69	9.1
ITEM 6	0.53	0.52	12.7	0.59	0.59	12.1	0.56	0.56	12.4
ITEM 7	0.55	0.74	12.5	0.60	0.75	12.0	0.57	0.74	12.3
ITEM 8	0.38	0.62	14.3	0.37	0.61	14.3	0.38	0.61	14.3
ITEM 9	0.45	0.60	13.5	0.48	0.58	13.2	0.47	0.59	13.3
ITEM 10	0.50	0.68	13.0	0.44	0.65	13.6	0.47	0.66	13.3
ITEM 11	0.43	0.73	13.7	0.31	0.67	14.9	0.37	0.69	14.3
ITEM 12	0.37	0.67	14.4	0.30	0.62	15.2	0.33	0.64	14.8
ITEM 13	0.31	0.39	14.9	0.38	0.52	14.2	0.35	0.46	14.6
ITEM 14	0.37	0.42	14.3	0.36	0.40	14.4	0.37	0.41	14.4
ITEM 15	0.44	0.63	13.6	0.53	0.70	12.7	0.48	0.66	13.2
MEAN	0.52	0.64	12.6	0.54	0.64	12.5	0.53	0.64	12.6
S.D.	0.17	0.11	2.0	0.18	0.09	2.1	0.17	0.10	2.0

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FCRMULA SCCRE	6.2	4.2	6.5	4.1	6.3	4.2
# RIGHT	7.6	3.5	7.9	3.5	7.7	3.5
# WRCNG	5.8	3.3	5.7	3.3	5.7	3.3
# CMITS	1.0	1.8	0.9	1.7	1.0	1.7
# NCT REACHED	0.7	1.7	0.5	1.4	0.6	1.6

COEFFICIENT ALPHA	0.78	0.78	0.78
SAMPLE SIZE	7639	7732	15748
POPULATION ESTIMATE	1264703	1271806	2559029

B2

NLS 1972
VOCABULARY

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.92	0.65	7.4	0.73	0.61	10.5	0.74	0.62	10.4	0.89	0.67	8.1
ITEM 2	0.55	0.74	12.5	0.35	0.66	14.6	0.36	0.64	14.4	0.52	0.74	12.8
ITEM 3	0.81	0.72	9.5	0.49	0.68	13.1	0.59	0.63	12.0	0.76	0.74	10.2
ITEM 4	0.67	0.71	11.2	0.36	0.56	14.4	0.47	0.55	13.3	0.63	0.71	11.7
ITEM 5	0.88	0.68	9.4	0.67	0.60	11.3	0.61	0.60	11.9	0.84	0.69	9.1
ITEM 6	0.58	0.55	12.2	0.42	0.52	13.8	0.46	0.45	13.4	0.56	0.56	12.4
ITEM 7	0.62	0.73	11.8	0.34	0.59	14.7	0.32	0.61	14.9	0.57	0.74	12.3
ITEM 8	0.41	0.61	13.9	0.20	0.46	16.4	0.20	0.41	16.3	0.38	0.61	14.3
ITEM 9	0.50	0.59	13.0	0.26	0.44	15.6	0.32	0.46	14.9	0.47	0.59	13.3
ITEM 10	0.50	0.64	13.0	0.27	0.61	15.5	0.27	0.52	15.5	0.47	0.66	13.3
ITEM 11	0.40	0.69	14.0	0.18	0.49	16.6	0.19	0.49	16.5	0.37	0.69	14.3
ITEM 12	0.35	0.64	14.5	0.19	0.40	16.6	0.17	0.36	16.8	0.33	0.64	14.9
ITEM 13	0.36	0.47	14.5	0.27	0.34	15.5	0.32	0.33	14.9	0.35	0.46	14.6
ITEM 14	0.37	0.42	14.3	0.28	0.35	15.4	0.36	0.45	14.4	0.37	0.41	14.4
ITEM 15	0.52	0.64	12.8	0.25	0.57	15.8	0.33	0.62	14.7	0.48	0.66	13.2
MEAN	0.56	0.63	12.2	0.35	0.52	14.6	0.38	0.52	14.3	0.53	0.64	12.6
S.D.	0.18	0.09	2.1	0.16	0.10	1.8	0.16	0.10	1.7	0.17	0.10	2.0

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	6.9	4.0	3.0	3.2	3.5	3.3	6.3	4.2
# RIGHT	8.2	3.4	4.9	2.7	5.4	2.8	7.7	3.5
# WRONG	5.4	3.2	7.8	3.2	7.6	3.1	5.7	3.3
# OMITS	0.9	1.7	1.0	1.9	1.0	1.8	1.0	1.7
# NOT REACHED	0.5	1.4	1.2	2.3	1.0	2.2	0.6	1.6
COEFFICIENT ALPHA	0.76		0.63		0.62		0.78	
SAMPLE SIZE	11804		1889		676		15748	
POPULATION ESTIMATE	2052880		231532		92233		2559029	

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                                                                          NLS 197
                                                                         VOCABULA

                              WHITE MALE           WHITE FEMALE          BLACK M
                          ----------------     ----------------     ----------
                          P+    RBIS  DELTA      P+    RBIS  DELTA      P+    RBIS
ITEM  1                  0.92  0.67    7.4     0.92  0.63    7.4     0.72  0.62
ITEM  2                  0.48  0.74   13.2     0.63  0.75   11.7     0.29  0.66
ITEM  3                  0.77  0.72   10.0     0.85  0.74    8.9     0.44  0.66
ITEM  4                  0.69  0.71   11.1     0.66  0.71   11.4     0.35  0.54
ITEM  5                  0.88  0.68    8.2     0.87  0.68    8.5     0.66  0.65
ITEM  6                  0.55  0.52   12.5     0.61  0.59   11.9     0.39  0.49
ITEM  7                  0.59  0.74   12.1     0.65  0.74   11.4     0.33  0.55
ITEM  8                  0.40  0.62   14.0     0.41  0.60   13.9     0.21  0.47
ITEM  9                  0.48  0.60   13.2     0.52  0.57   12.8     0.25  0.39
ITEM 10                  0.53  0.66   12.7     0.47  0.63   13.3     0.30  0.69
ITEM 11                  0.46  0.72   13.4     0.34  0.69   14.7     0.20  0.61
ITEM 12                  0.39  0.67   14.1     0.31  0.62   14.9     0.19  0.41
ITEM 13                  0.32  0.40   14.9     0.39  0.54   14.1     0.76  0.27
ITEM 14                  0.38  0.42   14.2     0.37  0.41   14.3     0.27  0.37
ITEM 15                  0.46  0.62   13.4     0.57  0.68   12.3     0.23  0.55

   MEAN                  0.55  0.63   12.3     0.57  0.64   12.1     0.34  0.53
   S.D.                  0.18  0.10    2.1     0.19  0.09    2.2     0.15  0.12

SUMMARY:
                            MEAN     S.D.         MEAN     S.D.         MEAN
FORMULA SCORE                6.7     4.0           7.1     4.0           2.8
# RIGHT                      8.1     3.4           8.4     3.3           4.7
# WRONG                      5.4     3.2           5.3     3.2           7.6
# OMITS                      1.0     1.7           0.9     1.6           1.1
# NOT REACHED                0.5     1.5           0.4     1.2           1.6

COEFFICIENT ALPHA              0.76                  0.76                  0.63
SAMPLE SIZE                    5887                  5835                   823
POPULATION ESTIMATE         1023734               1015237                102915
```

```
2
RY

ALE        BLACK FEMALE          HISPANIC MALE        HISPANIC FEMALE
------  ------------------   ------------------   ------------------
 DELTA   P+    RBIS  DELTA    P+    RBIS  DELTA    P+    RBIS  DELTA
 10.7   0.75  0.59  10.3     0.75  0.65  10.3     0.74  0.60  10.4
 15.2   0.39  0.65  14.2     0.29  0.67  15.3     0.43  0.63  13.7
 13.6   0.52  0.70  12.8     0.56  0.66  12.4     0.62  0.61  11.8
 14.6   0.37  0.56  14.3     0.45  0.49  13.5     0.49  0.62  13.1
 11.3   0.67  0.56  11.2     0.65  0.64  11.5     0.57  0.58  12.3
 14.1   0.45  0.55  13.5     0.40  0.43  14.0     0.52  0.46  12.8
 14.8   0.34  0.61  14.7     0.32  0.67  14.9     0.31  0.55  14.9
 16.2   0.18  0.46  16.6     0.19  0.43  16.5     0.22  0.37  16.1
 15.6   0.26  0.47  15.5     0.30  0.47  15.1     0.34  0.44  14.6
 15.0   0.24  0.53  15.8     0.31  0.55  15.0     0.23  0.52  16.0
 16.4   0.18  0.40  16.7     0.22  0.60  16.1     0.17  0.37  16.9
 16.5   0.18  0.39  16.6     0.22  0.41  16.1     0.14  0.32  17.4
 15.5   0.26  0.41  15.5     0.30  0.38  15.1     0.34  0.27  14.6
 15.4   0.28  0.33  15.3     0.32  0.49  14.9     0.40  0.40  14.0
 15.9   0.25  0.58  15.7     0.32  0.66  14.8     0.34  0.57  14.7

 14.7   0.36  0.52  14.6     0.37  0.55  14.4     0.39  0.49  14.2
  1.7   0.17  0.10   1.9     0.16  0.11   1.7     0.17  0.11   1.9

.D.         MEAN     S.D.         MEAN     S.D.         MEAN     S.D.
.1           3.1      3.2          3.3      3.4          3.7      3.2
.7           5.1      2.7          5.2      2.9          5.6      2.7
.2           7.9      3.2          7.6      3.3          7.6      3.0
.9           1.0      1.8          1.0      1.8          1.0      1.9
.6           1.0      2.0          1.2      2.4          0.8      1.9

                 0.63                 0.66                 0.59
                 1048                  339                  330
               126309                45288                45883
```

B4

NLS 1972
READING

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.83	0.66	9.2	0.83	0.63	9.1	0.83	0.65	9.2
ITEM 2	0.74	0.68	10.4	0.77	0.62	10.1	0.75	0.65	10.3
ITEM 3	0.85	0.57	8.9	0.89	0.55	8.0	0.87	0.56	8.5
ITEM 4	0.67	0.64	11.3	0.72	0.62	10.7	0.69	0.63	11.0
ITEM 5	0.68	0.59	11.1	0.73	0.59	10.6	0.71	0.59	10.8
ITEM 6	0.81	0.70	9.5	0.75	0.67	10.3	0.78	0.67	9.9
ITEM 7	0.52	0.60	12.8	0.48	0.63	13.2	0.50	0.61	13.0
ITEM 8	0.54	0.66	12.6	0.59	0.73	12.1	0.57	0.69	12.3
ITEM 9	0.53	0.59	12.7	0.57	0.53	12.3	0.55	0.55	12.5
ITEM 10	0.54	0.60	12.6	0.63	0.59	11.7	0.59	0.59	12.1
ITEM 11	0.49	0.54	13.1	0.50	0.55	13.0	0.49	0.54	13.1
ITEM 12	0.82	0.61	9.3	0.84	0.56	9.1	0.83	0.59	9.2
ITEM 13	0.63	0.65	11.7	0.61	0.69	11.9	0.62	0.69	11.8
ITEM 14	0.35	0.48	14.5	0.30	0.50	15.1	0.33	0.49	14.8
ITEM 15	0.22	0.44	16.1	0.26	0.54	15.5	0.24	0.49	15.8
ITEM 16	0.51	0.59	12.9	0.52	0.61	12.8	0.52	0.60	12.8
ITEM 17	0.37	0.39	14.4	0.38	0.40	14.2	0.37	0.40	14.3
ITEM 18	0.75	0.59	10.3	0.71	0.60	10.8	0.73	0.59	10.6
ITEM 19	0.43	0.49	13.7	0.44	0.50	13.6	0.43	0.49	13.7
ITEM 20	0.54	0.64	12.6	0.46	0.58	13.4	0.50	0.60	13.0
MEAN	0.59	0.59	12.0	0.60	0.58	11.9	0.59	0.58	11.9
S.D.	0.17	0.08	1.9	0.18	0.07	2.0	0.17	0.07	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	9.5	5.1	9.8	5.0	9.7	5.1
# RIGHT	11.4	4.2	11.7	4.1	11.5	4.2
# WRONG	7.6	3.9	7.5	3.9	7.6	3.9
# OMITS	0.2	0.6	0.2	0.7	0.2	0.6
# NOT REACHED	0.8	1.9	0.6	1.6	0.7	1.8
COEFFICIENT ALPHA	0.79		0.79		0.79	
SAMPLE SIZE	7639		7732		15748	
POPULATION ESTIMATE	1264703		1271806		2559029	

B5

NLS 1972
READING

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	PBIS	DELTA	P+	PBIS	DELTA	P+	PBIS	DELTA	P+	PBIS	DELTA
ITEM 1	0.86	0.61	8.7	0.70	0.61	10.9	0.69	0.65	11.0	0.83	0.65	9.2
ITEM 2	0.78	0.66	9.9	0.63	0.56	11.7	0.65	0.63	11.4	0.75	0.65	10.3
ITEM 3	0.89	0.52	8.0	0.77	0.56	10.1	0.78	0.53	9.9	0.87	0.56	8.5
ITEM 4	0.72	0.62	10.7	0.60	0.66	11.9	0.56	0.61	12.4	0.69	0.63	11.0
ITEM 5	0.73	0.56	10.5	0.60	0.61	12.0	0.56	0.55	12.4	0.71	0.59	10.8
ITEM 6	0.81	0.65	9.4	0.58	0.62	12.2	0.62	0.57	11.8	0.78	0.67	9.9
ITEM 7	0.54	0.58	12.6	0.28	0.60	15.4	0.34	0.59	14.6	0.50	0.61	13.0
ITEM 8	0.61	0.67	11.9	0.31	0.61	14.9	0.37	0.63	14.4	0.57	0.69	12.3
ITEM 9	0.59	0.52	12.1	0.38	0.50	14.3	0.33	0.64	14.8	0.55	0.55	12.5
ITEM 10	0.62	0.58	11.8	0.43	0.56	13.7	0.42	0.56	13.8	0.59	0.59	12.1
ITEM 11	0.53	0.52	12.7	0.31	0.48	14.9	0.31	0.48	14.9	0.49	0.54	13.1
ITEM 12	0.85	0.54	8.8	0.71	0.60	10.8	0.73	0.62	10.6	0.83	0.59	9.2
ITEM 13	0.66	0.66	11.4	0.37	0.63	14.3	0.41	0.59	13.9	0.62	0.65	11.8
ITEM 14	0.35	0.47	14.6	0.20	0.50	16.3	0.21	0.38	16.3	0.33	0.49	14.8
ITEM 15	0.25	0.52	15.7	0.16	0.23	17.0	0.18	0.29	16.6	0.24	0.49	15.8
ITEM 16	0.55	0.59	12.5	0.33	0.56	14.7	0.29	0.53	15.2	0.52	0.60	12.8
ITEM 17	0.38	0.39	14.2	0.31	0.44	15.0	0.33	0.32	14.8	0.37	0.40	14.3
ITEM 18	0.76	0.57	10.2	0.51	0.49	12.9	0.58	0.50	12.2	0.73	0.59	10.6
ITEM 19	0.45	0.51	13.5	0.27	0.28	15.4	0.31	0.35	14.9	0.43	0.49	13.7
ITEM 20	0.53	0.60	12.7	0.29	0.34	15.2	0.29	0.44	15.2	0.50	0.60	13.0
MEAN	0.62	0.57	11.6	0.44	0.52	13.7	0.45	0.52	13.6	0.59	0.58	11.9
S.D.	0.18	0.07	2.0	0.19	0.12	1.9	0.18	0.11	1.9	0.17	0.07	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	10.4	4.8	5.7	4.5	6.0	4.6	9.7	5.1
# RIGHT	12.7	3.9	8.1	3.7	8.5	3.8	11.5	4.2
# WRONG	7.1	3.7	9.8	3.9	10.0	3.9	7.6	3.9
# OMITS	0.2	0.6	0.2	0.7	0.2	0.7	0.2	0.6
# NOT REACHED	0.5	1.5	1.8	2.7	1.2	2.3	0.7	1.8
COEFFICIENT ALPHA	0.77		0.73		0.73		0.79	
SAMPLE SIZE	11804		1889		676		15748	
POPULATION ESTIMATE	2052880		231532		92233		2559029	

NLS 1972
READING

	WHITE MALE			WHITE FEMALE			BLACK MAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	D
ITEM 1	0.86	0.63	8.7	0.86	0.60	8.6	0.68	0.64	1
ITEM 2	0.77	0.67	10.1	0.79	0.64	9.8	0.60	0.64	1
ITEM 3	0.87	0.53	8.4	0.91	0.50	7.5	0.74	0.58	1
ITEM 4	0.69	0.63	11.0	0.74	0.61	10.4	0.55	0.68	1
ITEM 5	0.71	0.56	10.8	0.75	0.57	10.3	0.55	0.60	1
ITEM 6	0.84	0.66	8.9	0.79	0.65	9.8	0.60	0.66	1
ITEM 7	0.56	0.56	12.4	0.52	0.61	12.8	0.31	0.63	1
ITEM 8	0.58	0.64	12.2	0.65	0.71	11.5	0.32	0.59	1
ITEM 9	0.56	0.56	12.3	0.61	0.49	11.9	0.31	0.50	1
ITEM 10	0.57	0.58	12.3	0.67	0.57	11.3	0.42	0.64	1
ITEM 11	0.53	0.52	12.7	0.53	0.52	12.7	0.32	0.48	1
ITEM 12	0.85	0.56	8.9	0.86	0.51	8.7	0.68	0.60	1
ITEM 13	0.67	0.67	11.3	0.65	0.66	11.4	0.39	0.66	1
ITEM 14	0.37	0.46	14.3	0.32	0.48	14.9	0.21	0.53	1
ITEM 15	0.23	0.47	16.0	0.28	0.57	15.3	0.17	0.19	1
ITEM 16	0.55	0.57	12.5	0.55	0.61	12.5	0.33	0.59	1
ITEM 17	0.37	0.39	14.3	0.39	0.39	14.1	0.32	0.49	1
ITEM 18	0.78	0.58	10.0	0.75	0.57	10.3	0.54	0.48	1
ITEM 19	0.45	0.50	13.5	0.46	0.52	13.4	0.25	0.24	1
ITEM 20	0.57	0.64	12.3	0.49	0.58	13.1	0.33	0.43	1
MEAN	0.62	0.57	11.7	0.63	0.57	11.5	0.43	0.54	1
S.D.	0.18	0.07	2.0	0.18	0.07	2.1	0.17	0.13	

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.
FORMULA SCORE	10.3	4.8	10.6	4.7	5.5	4.
# RIGHT	12.1	4.0	12.4	3.9	7.9	3.
# WRONG	7.2	3.7	7.0	3.7	9.8	4.
# OMITS	0.1	0.6	0.2	0.7	0.2	0.
# NOT REACHED	0.6	1.7	0.4	1.3	2.1	3.

COEFFICIENT ALPHA	0.77	0.76	0.76
SAMPLE SIZE	5887	5835	823
POPULATION ESTIMATE	1023734	1015237	102915

E	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
EI TA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
1.1	0.72	0.57	10.7	0.71	0.71	10.8	0.67	0.60	11.3
2.0	0.65	0.47	11.4	0.61	0.67	11.9	0.70	0.60	10.9
0.5	0.79	0.54	9.8	0.76	0.53	10.1	0.80	0.55	9.6
2.5	0.65	0.62	11.5	0.57	0.62	12.3	0.54	0.60	12.6
2.5	0.63	0.61	11.7	0.52	0.61	12.8	0.59	0.51	12.1
2.0	0.56	0.59	12.4	0.64	0.59	11.6	0.60	0.56	12.0
4.9	0.25	0.57	15.7	0.38	0.62	14.2	0.30	0.58	15.1
4.9	0.31	0.63	15.0	0.37	0.63	14.3	0.36	0.63	14.4
4.9	0.43	0.49	13.7	0.34	0.62	14.7	0.32	0.67	14.8
3.8	0.43	0.48	13.7	0.38	0.50	14.2	0.46	0.65	13.4
4.9	0.31	0.50	15.0	0.30	0.48	15.1	0.32	0.50	14.9
1.1	0.73	0.61	10.5	0.72	0.61	10.7	0.73	0.64	10.5
4.1	0.35	0.60	14.5	0.43	0.63	13.7	0.40	0.56	14.0
6.2	0.20	0.47	16.4	0.25	0.43	15.7	0.16	0.34	16.9
6.9	0.16	0.27	17.1	0.18	0.35	16.6	0.19	0.22	16.6
4.7	0.34	0.53	14.7	0.26	0.50	15.6	0.31	0.60	15.0
4.8	0.30	0.40	15.1	0.34	0.35	14.7	0.31	0.28	15.0
2.6	0.48	0.50	13.2	0.64	0.48	11.6	0.52	0.54	12.8
5.7	0.29	0.32	15.3	0.31	0.43	15.0	0.31	0.27	14.9
4.7	0.25	0.26	15.7	0.33	0.56	14.8	0.25	0.29	15.6
3.7	0.44	0.50	13.7	0.45	0.54	13.5	0.44	0.51	13.6
1.8	0.19	0.11	2.1	0.17	0.10	1.9	0.18	0.14	2.0

D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
7	5.9	4.2	6.1	4.8	5.9	4.4
9	8.3	3.5	8.6	3.9	8.4	3.6
1	9.9	3.8	10.1	3.9	10.0	3.8
6	0.3	0.8	0.2	0.7	0.2	0.7
0	1.6	2.5	1.1	2.2	1.4	2.4
	0.70		0.75		0.72	
	1048		339		330	
	126309		45288		45883	

NLS 19
READIN

	WHITE MALE			WHITE FEMALE			BLACK	
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS
ITEM 1	0.86	0.63	8.7	0.86	0.60	8.6	0.68	0.64
ITEM 2	0.77	0.67	10.1	0.79	0.64	9.8	0.60	0.64
ITEM 3	0.87	0.53	8.4	0.91	0.50	7.5	0.74	0.58
ITEM 4	0.69	0.63	11.0	0.74	0.61	10.4	0.55	0.68
ITEM 5	0.71	0.56	10.8	0.75	0.57	10.3	0.55	0.60
ITEM 6	0.84	0.66	8.9	0.79	0.65	9.8	0.60	0.66
ITEM 7	0.56	0.56	12.4	0.52	0.61	12.8	0.31	0.63
ITEM 8	0.58	0.64	12.2	0.65	0.71	11.5	0.32	0.59
ITEM 9	0.56	0.56	12.3	0.61	0.49	11.9	0.31	0.50
ITEM 10	0.57	0.58	12.3	0.67	0.57	11.3	0.42	0.64
ITEM 11	0.53	0.52	12.7	0.53	0.52	12.7	0.32	0.48
ITEM 12	0.85	0.56	8.9	0.86	0.51	8.7	0.68	0.60
ITEM 13	0.67	0.67	11.3	0.65	0.66	11.4	0.39	0.66
ITEM 14	0.37	0.46	14.3	0.32	0.48	14.9	0.21	0.53
ITEM 15	0.23	0.47	16.0	0.28	0.57	15.3	0.17	0.19
ITEM 16	0.55	0.57	12.5	0.55	0.61	12.5	0.33	0.59
ITEM 17	0.37	0.39	14.3	0.39	0.39	14.1	0.32	0.49
ITEM 18	0.78	0.58	10.0	0.75	0.57	10.3	0.54	0.48
ITEM 19	0.45	0.50	13.5	0.46	0.52	13.4	0.25	0.24
ITEM 20	0.57	0.64	12.3	0.49	0.58	13.1	0.33	0.43
MEAN	0.62	0.57	11.7	0.63	0.57	11.5	0.43	0.54
S.D.	0.18	0.07	2.0	0.18	0.07	2.1	0.17	0.13

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN
FORMULA SCORE	10.3	4.8	10.6	4.7	5.5
# RIGHT	12.1	4.0	12.4	3.9	7.9
# WRONG	7.2	3.7	7.0	3.7	9.8
# OMITS	0.1	0.6	0.2	0.7	0.2
# NOT REACHED	0.6	1.7	0.4	1.3	2.1
COEFFICIENT ALPHA	0.77		0.76		0.76
SAMPLE SIZE	5887		5835		823
POPULATION ESTIMATE	1023734		1015237		102915

72
6

MALE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
11.1	0.72	0.57	10.7	0.71	0.71	10.8	0.67	0.60	11.3
12.0	0.65	0.47	11.4	0.61	0.67	11.9	0.70	0.60	10.9
10.5	0.79	0.54	9.8	0.76	0.53	10.1	0.80	0.55	9.6
12.5	0.65	0.62	11.5	0.57	0.62	12.3	0.54	0.60	12.6
12.5	0.63	0.61	11.7	0.52	0.61	12.8	0.59	0.51	12.1
12.0	0.56	0.59	12.4	0.64	0.59	11.6	0.60	0.56	12.0
14.9	0.25	0.57	15.7	0.38	0.62	14.2	0.30	0.58	15.1
14.9	0.31	0.63	15.0	0.37	0.63	14.3	0.36	0.63	14.4
14.9	0.43	0.49	13.7	0.34	0.62	14.7	0.32	0.67	14.8
13.8	0.43	0.48	13.7	0.38	0.50	14.2	0.46	0.65	13.4
14.9	0.31	0.50	15.0	0.30	0.48	15.1	0.32	0.50	14.9
11.1	0.73	0.61	10.5	0.72	0.61	10.7	0.73	0.64	10.5
14.1	0.35	0.60	14.5	0.43	0.63	13.7	0.40	0.56	14.0
16.2	0.20	0.47	16.4	0.25	0.43	15.7	0.16	0.34	16.9
16.9	0.16	0.27	17.1	0.18	0.35	16.6	0.19	0.22	16.6
14.7	0.34	0.53	14.7	0.26	0.50	15.6	0.31	0.60	15.0
14.8	0.30	0.40	15.1	0.34	0.35	14.7	0.31	0.28	15.0
12.6	0.48	0.50	13.2	0.64	0.48	11.6	0.52	0.54	12.8
15.7	0.29	0.32	15.3	0.31	0.43	15.0	0.31	0.27	14.9
14.7	0.25	0.26	15.7	0.33	0.56	14.8	0.25	0.29	15.6
13.7	0.44	0.50	13.7	0.45	0.54	13.5	0.44	0.51	13.6
1.8	0.19	0.11	2.1	0.17	0.10	1.9	0.18	0.14	2.0

S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
4.7	5.9	4.2	6.1	4.8	5.9	4.4
3.9	8.3	3.5	8.6	3.9	8.4	3.6
4.1	9.9	3.8	10.1	3.9	10.0	3.8
0.6	0.3	0.8	0.2	0.7	0.2	0.7
3.0	1.6	2.5	1.1	2.2	1.4	2.4

0.70	0.75	0.72
1048	339	330
126309	45288	45883

B8

NLS 1972
MATH

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.84	0.55	9.0	0.82	0.56	9.4	0.83	0.55	9.2
ITEM 2	0.79	0.37	9.8	0.72	0.35	10.6	0.76	0.36	10.2
ITEM 3	0.85	0.59	8.8	0.82	0.52	9.4	0.83	0.56	9.1
ITEM 4	0.85	0.51	8.8	0.79	0.48	9.8	0.82	0.50	9.3
ITEM 5	0.73	0.80	10.5	0.69	0.77	11.0	0.71	0.78	10.8
ITEM 6	0.81	0.59	9.5	0.73	0.57	10.5	0.77	0.59	10.0
ITEM 7	0.78	0.71	9.8	0.74	0.61	10.4	0.76	0.66	10.2
ITEM 8	0.65	0.68	11.5	0.56	0.61	12.4	0.61	0.65	11.9
ITEM 9	0.74	0.56	10.5	0.74	0.57	10.5	0.74	0.56	10.5
ITEM 10	0.62	0.72	11.7	0.57	0.69	12.3	0.60	0.70	12.0
ITEM 11	0.64	0.58	11.6	0.54	0.62	12.8	0.59	0.60	12.1
ITEM 12	0.75	0.72	10.3	0.66	0.68	11.4	0.70	0.70	10.9
ITEM 13	0.65	0.72	11.4	0.63	0.72	11.7	0.64	0.72	11.6
ITEM 14	0.71	0.53	10.8	0.64	0.57	11.5	0.68	0.56	11.2
ITEM 15	0.60	0.55	12.0	0.53	0.53	12.7	0.56	0.54	12.4
ITEM 16	0.56	0.77	12.4	0.56	0.76	12.4	0.56	0.76	12.4
ITEM 17	0.62	0.72	11.7	0.59	0.63	12.0	0.61	0.67	11.9
ITEM 18	0.60	0.61	12.0	0.50	0.56	13.0	0.55	0.59	12.5
ITEM 19	0.59	0.52	12.1	0.52	0.47	12.8	0.56	0.50	12.4
ITEM 20	0.62	0.75	11.8	0.59	0.68	12.1	0.61	0.72	11.9
ITEM 21	0.51	0.77	12.9	0.47	0.76	13.3	0.49	0.76	13.1
ITEM 22	0.55	0.66	12.5	0.46	0.66	13.4	0.50	0.66	13.0
ITEM 23	0.48	0.65	13.2	0.38	0.60	14.2	0.43	0.63	13.7
ITEM 24	0.52	0.67	12.8	0.43	0.57	13.7	0.47	0.63	13.3
ITEM 25	0.48	0.64	13.2	0.46	0.49	13.4	0.47	0.56	13.3
MEAN	0.66	0.64	11.2	0.61	0.60	11.9	0.63	0.62	11.6
S.D.	0.11	0.10	1.3	0.12	0.10	1.3	0.12	0.10	1.3

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	13.6	7.4	11.9	7.2	12.7	7.3
# RIGHT	16.3	5.7	14.9	5.6	15.6	5.7
# WRONG	8.0	5.4	9.0	5.3	8.5	5.4
# OMITS	0.2	0.9	0.5	1.4	0.4	1.2
# NOT REACHED	0.5	1.8	0.6	1.9	0.6	1.9
COEFFICIENT ALPHA	0.87		0.85		0.86	
SAMPLE SIZE	7639		7732		15748	
POPULATION ESTIMATE	1264703		1271806		2559029	

B9

NLS 1972
MATH

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	PBIS	DELTA	P+	PBIS	DELTA	P+	PBIS	DELTA	P+	PBIS	DELTA
ITEM 1	0.86	0.49	8.6	0.66	0.57	11.3	0.65	0.55	11.4	0.83	0.55	9.2
ITEM 2	0.77	0.35	10.1	0.68	0.42	11.1	0.73	0.39	10.6	0.76	0.36	10.2
ITEM 3	0.86	0.54	8.6	0.67	0.38	11.2	0.73	0.47	10.6	0.83	0.56	9.1
ITEM 4	0.85	0.48	8.9	0.67	0.38	11.2	0.72	0.42	10.6	0.82	0.50	9.3
ITEM 5	0.76	0.79	10.2	0.47	0.66	13.3	0.51	0.66	12.9	0.71	0.78	10.8
ITEM 6	0.81	0.58	9.5	0.58	0.35	12.2	0.57	0.45	12.3	0.77	0.59	10.0
ITEM 7	0.80	0.64	9.6	0.55	0.55	12.4	0.56	0.60	12.3	0.76	0.66	10.2
ITEM 8	0.64	0.63	11.5	0.39	0.56	14.2	0.44	0.52	13.6	0.61	0.65	11.9
ITEM 9	0.77	0.54	10.1	0.57	0.48	12.3	0.60	0.58	12.0	0.74	0.56	10.5
ITEM 10	0.64	0.70	11.6	0.38	0.54	14.2	0.42	0.63	13.8	0.60	0.70	12.0
ITEM 11	0.63	0.58	11.7	0.36	0.53	14.5	0.42	0.58	13.8	0.59	0.60	12.1
ITEM 12	0.73	0.70	10.5	0.54	0.61	12.6	0.56	0.62	12.4	0.70	0.70	10.9
ITEM 13	0.68	0.70	11.1	0.40	0.69	14.0	0.47	0.64	13.3	0.64	0.72	11.6
ITEM 14	0.71	0.51	10.7	0.41	0.54	13.9	0.55	0.52	12.5	0.68	0.56	11.2
ITEM 15	0.59	0.55	12.0	0.42	0.39	13.8	0.38	0.36	14.2	0.56	0.54	12.4
ITEM 16	0.60	0.76	12.0	0.32	0.69	14.9	0.42	0.70	13.8	0.56	0.76	12.4
ITEM 17	0.64	0.68	11.6	0.43	0.54	13.7	0.48	0.60	13.2	0.61	0.67	11.9
ITEM 18	0.59	0.57	12.2	0.36	0.52	14.4	0.36	0.55	14.4	0.55	0.59	12.5
ITEM 19	0.58	0.50	12.2	0.40	0.41	14.0	0.45	0.38	13.5	0.56	0.50	12.4
ITEM 20	0.65	0.70	11.5	0.35	0.62	14.5	0.39	0.64	14.1	0.61	0.72	11.9
ITEM 21	0.53	0.75	12.7	0.24	0.71	15.9	0.35	0.63	14.5	0.49	0.76	13.1
ITEM 22	0.54	0.65	12.6	0.25	0.46	15.7	0.32	0.50	14.9	0.50	0.66	13.0
ITEM 23	0.46	0.65	13.4	0.26	0.31	15.6	0.27	0.42	15.5	0.43	0.63	13.7
ITEM 24	0.51	0.61	12.9	0.27	0.60	15.5	0.30	0.51	15.1	0.47	0.63	13.2
ITEM 25	0.49	0.59	13.1	0.35	0.24	14.5	0.37	0.32	14.3	0.47	0.56	13.3
MEAN	0.67	0.61	11.2	0.44	0.51	13.6	0.48	0.53	13.2	0.63	0.62	11.6
S.D.	0.12	0.10	1.4	0.14	0.12	1.4	0.13	0.10	1.4	0.12	0.10	1.3

SUMMARY:

	WHITE		BLACK		HISPANIC		TOTAL	
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	13.9	7.0	6.4	6.0	7.8	6.5	12.7	7.3
# RIGHT	16.5	5.4	10.5	4.7	11.6	5.0	15.6	5.7
# WRONG	7.8	5.1	12.3	5.0	11.7	5.1	8.5	5.4
# OMITS	0.3	1.1	0.6	1.6	0.5	1.5	0.4	1.2
# NOT REACHED	0.4	1.5	1.7	3.1	1.1	2.7	0.6	1.9
COEFFICIENT ALPHA	0.85		0.77		0.80		0.86	
SAMPLE SIZE	11804		1889		676		15748	
POPULATION ESTIMATE	2052880		231532		92233		2559029	

NLS 19

MATH

	WHITE MALE			WHITE FEMALE			BLACK	
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS
ITEM 1	0.87	0.49	8.4	0.85	0.49	8.8	0.68	0.56
ITEM 2	0.80	0.34	9.6	0.73	0.34	10.5	0.71	0.45
ITEM 3	0.88	0.56	8.2	0.84	0.51	8.9	0.66	0.44
ITEM 4	0.87	0.49	8.4	0.82	0.47	9.3	0.71	0.45
ITEM 5	0.77	0.82	10.0	0.74	0.75	10.5	0.50	0.63
ITEM 6	0.84	0.58	9.0	0.78	0.58	10.0	0.62	0.44
ITEM 7	0.82	0.70	9.3	0.78	0.59	9.9	0.56	0.63
ITEM 8	0.69	0.67	11.1	0.60	0.59	12.0	0.39	0.58
ITEM 9	0.77	0.54	10.1	0.77	0.55	10.0	0.57	0.49
ITEM 10	0.66	0.72	11.3	0.61	0.68	11.9	0.42	0.56
ITEM 11	0.67	0.56	11.2	0.59	0.60	12.1	0.42	0.55
ITEM 12	0.78	0.72	9.9	0.69	0.68	11.1	0.57	0.59
ITEM 13	0.69	0.71	11.0	0.67	0.69	11.2	0.42	0.67
ITEM 14	0.74	0.49	10.4	0.69	0.52	11.0	0.47	0.53
ITEM 15	0.63	0.55	11.7	0.56	0.53	12.4	0.43	0.37
ITEM 16	0.60	0.78	12.0	0.60	0.75	12.0	0.32	0.64
ITEM 17	0.66	0.72	11.4	0.62	0.64	11.8	0.42	0.61
ITEM 18	0.64	0.58	11.6	0.52	0.54	12.8	0.38	0.55
ITEM 19	0.61	0.53	11.9	0.55	0.46	12.5	0.43	0.46
ITEM 20	0.66	0.74	11.3	0.64	0.67	11.6	0.35	0.67
ITEM 21	0.55	0.77	12.5	0.51	0.75	12.9	0.25	0.72
ITEM 22	0.59	0.63	12.1	0.50	0.65	13.0	0.28	0.50
ITEM 23	0.51	0.67	12.9	0.41	0.62	14.0	0.29	0.32
ITEM 24	0.55	0.65	12.5	0.46	0.55	13.4	0.27	0.66
ITEM 25	0.50	0.67	13.0	0.48	0.52	13.2	0.32	0.27
MEAN	0.70	0.63	10.8	0.64	0.59	11.5	0.46	0.53
S.D.	0.11	0.11	1.4	0.12	0.10	1.4	0.14	0.11

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN
FORMULA SCORE	14.7	7.0	13.0	6.9	6.9
# RIGHT	17.2	5.3	15.8	5.3	10.9
# WRONG	7.3	5.1	8.3	5.1	11.9
# OMITS	0.2	0.8	0.5	1.4	0.4
# NOT REACHED	0.4	1.5	0.5	1.6	1.8

COEFFICIENT ALPHA	0.86	0.84	0.79
SAMPLE SIZE	5887	5835	823
POPULATION ESTIMATE	1023734	1015237	102915

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'2

ALE          BLACK FEMALE              HISPANIC MALE             HISPANIC FEMALE
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 DELTA     P+     RBIS   DELTA      P+     RBIS   DELTA      P+     RBIS   DELTA
 11.1     0.65   0.57   11.5      0.68   0.54   11.1      0.63   0.56   11.7
 10.8     0.66   0.39   11.4      0.76   0.36   10.1      0.69   0.41   11.1
 11.4     0.69   0.33   11.1      0.73   0.51   10.6      0.73   0.43   10.5
 10.8     0.64   0.33   11.5      0.75   0.38   10.2      0.70   0.45   11.0
 13.0     0.45   0.69   13.5      0.58   0.63   12.2      0.44   0.70   13.6
 11.8     0.55   0.25   12.5      0.64   0.44   11.6      0.51   0.44   12.9
 12.4     0.55   0.48   12.5      0.61   0.60   11.9      0.52   0.59   12.8
 14.1     0.38   0.54   14.2      0.49   0.60   13.1      0.39   0.42   14.1
 12.3     0.58   0.48   12.2      0.58   0.63   12.2      0.63   0.56   11.7
 13.8     0.35   0.52   14.6      0.44   0.66   13.6      0.40   0.62   14.0
 13.8     0.30   0.49   15.1      0.48   0.57   13.2      0.37   0.57   14.3
 12.3     0.51   0.62   12.9      0.61   0.68   11.9      0.52   0.55   12.8
 13.8     0.39   0.71   14.2      0.48   0.62   13.2      0.48   0.68   13.2
 13.3     0.37   0.54   14.3      0.60   0.47   11.9      0.50   0.56   13.0
 13.7     0.41   0.41   13.9      0.38   0.49   14.2      0.37   0.24   14.3
 14.9     0.32   0.75   14.8      0.45   0.72   13.5      0.40   0.68   14.1
 13.8     0.44   0.48   13.6      0.47   0.69   13.3      0.49   0.52   13.1
 14.2     0.35   0.49   14.6      0.40   0.55   14.0      0.33   0.54   14.8
 13.7     0.38   0.37   14.2      0.50   0.31   13.0      0.41   0.43   13.9
 14.5     0.35   0.58   14.5      0.39   0.69   14.2      0.41   0.60   13.9
 15.8     0.23   0.73   16.0      0.37   0.61   14.3      0.33   0.63   14.7
 15.3     0.22   0.43   16.1      0.35   0.43   14.5      0.29   0.58   15.3
 15.2     0.24   0.32   15.8      0.30   0.45   15.1      0.25   0.36   15.8
 15.5     0.27   0.53   15.5      0.35   0.58   14.6      0.25   0.39   15.7
 14.8     0.37   0.22   14.3      0.34   0.35   14.7      0.42   0.30   13.8

 13.5     0.43   0.49   13.8      0.51   0.54   12.9      0.46   0.51   13.4
  1.5     0.14   0.14    1.5      0.14   0.12    1.4      0.13   0.12    1.4


S.D.           MEAN     S.D.             MEAN     S.D.            MEAN     S.D.
6.3             6.0     5.7               8.6     6.6              7.0     6.2
4.9            10.1     4.4              12.3     5.1             11.0     4.9
5.1            12.6     4.9              11.3     5.2             12.0     5.0
1.6             0.7     1.7               0.4     1.2              0.7     1.7
3.2             1.6     3.0               1.0     2.5              1.3     3.0

                   0.75                    0.81                     0.78
                   1048                     339                      330
                 126309                   45288                    45883
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B11

NLS 1972
LETTER GROUPS

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.90	0.67	7.9	0.90	0.65	7.8	0.90	0.66	7.9
ITEM 2	0.62	0.65	11.8	0.67	0.66	11.2	0.65	0.66	11.5
ITEM 3	0.84	0.62	9.0	0.89	0.60	8.1	0.87	0.62	8.6
ITEM 4	0.93	0.79	7.0	0.94	0.76	6.8	0.94	0.77	6.9
ITEM 5	0.67	0.73	11.2	0.72	0.78	10.7	0.70	0.75	11.0
ITEM 6	0.91	0.81	7.7	0.92	0.75	7.3	0.91	0.78	7.5
ITEM 7	0.69	0.74	11.0	0.75	0.76	10.3	0.72	0.75	10.7
ITEM 8	0.65	0.55	11.4	0.72	0.54	10.7	0.68	0.55	11.1
ITEM 9	0.64	0.66	11.6	0.68	0.67	11.1	0.66	0.66	11.3
ITEM 10	0.84	0.66	9.0	0.85	0.63	8.8	0.85	0.64	8.9
ITEM 11	0.76	0.68	10.1	0.78	0.69	9.9	0.77	0.68	10.0
ITEM 12	0.91	0.85	7.5	0.95	0.84	6.5	0.93	0.86	7.1
ITEM 13	0.88	0.74	8.2	0.91	0.66	7.6	0.90	0.71	7.9
ITEM 14	0.70	0.71	10.9	0.73	0.72	10.5	0.72	0.72	10.7
ITEM 15	0.80	0.67	9.6	0.80	0.62	9.6	0.80	0.65	9.6
ITEM 16	0.79	0.75	10.0	0.82	0.82	9.3	0.80	0.79	9.6
ITEM 17	0.78	0.81	9.9	0.82	0.82	9.3	0.80	0.82	9.6
ITEM 18	0.65	0.53	11.5	0.68	0.51	11.2	0.66	0.52	11.3
ITEM 19	0.52	0.50	12.8	0.58	0.49	12.2	0.55	0.50	12.5
ITEM 20	0.80	0.81	9.7	0.85	0.86	8.9	0.82	0.83	9.3
ITEM 21	0.65	0.72	11.5	0.69	0.74	11.0	0.67	0.73	11.2
ITEM 22	0.38	0.42	14.2	0.41	0.44	13.9	0.40	0.43	14.0
ITEM 23	0.26	0.42	15.6	0.26	0.42	15.5	0.26	0.41	15.6
ITEM 24	0.64	0.67	11.5	0.71	0.72	10.8	0.68	0.70	11.2
ITEM 25	0.59	0.59	12.1	0.65	0.55	11.4	0.62	0.57	11.8
MEAN	0.71	0.67	10.5	0.75	0.67	10.0	0.73	0.67	10.3
S.D.	0.16	0.11	2.0	0.16	0.12	2.1	0.16	0.12	2.0

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	15.5	6.0	16.9	5.6	16.2	5.9
# RIGHT	16.8	5.0	18.0	4.7	17.4	4.9
# WRONG	5.2	5.0	4.4	4.5	4.8	4.8
# OMITS	1.2	2.0	1.4	2.0	1.3	2.0
# NOT REACHED	1.8	2.9	1.3	2.2	1.5	2.6

COEFFICIENT ALPHA	0.86	0.85	0.86
SAMPLE SIZE	7639	7732	15748
POPULATION ESTIMATE	1264703	1271806	2559029

B12

NLS 1972
LETTER GROUPS

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.92	0.60	7.4	0.82	0.72	9.4	0.81	0.62	9.5	0.90	0.66	7.9
ITEM 2	0.68	0.66	11.2	0.50	0.62	13.0	0.50	0.53	13.0	0.65	0.66	11.5
ITEM 3	0.89	0.60	8.2	0.76	0.54	10.2	0.77	0.61	10.1	0.87	0.62	8.6
ITEM 4	0.95	0.71	6.3	0.84	0.77	9.1	0.87	0.72	8.5	0.94	0.77	6.9
ITEM 5	0.74	0.75	10.4	0.45	0.63	13.5	0.54	0.68	12.6	0.70	0.75	11.0
ITEM 6	0.93	0.72	7.0	0.82	0.79	9.3	0.84	0.83	8.9	0.91	0.78	7.5
ITEM 7	0.75	0.75	10.3	0.55	0.68	12.5	0.59	0.70	12.1	0.72	0.75	10.7
ITEM 8	0.72	0.54	10.7	0.49	0.45	13.1	0.54	0.39	12.6	0.68	0.55	11.1
ITEM 9	0.70	0.66	10.9	0.46	0.55	13.4	0.49	0.60	13.1	0.66	0.66	11.3
ITEM 10	0.87	0.61	8.5	0.73	0.64	10.5	0.75	0.60	10.3	0.85	0.64	8.9
ITEM 11	0.80	0.65	9.6	0.61	0.68	11.8	0.61	0.70	11.9	0.77	0.68	10.0
ITEM 12	0.95	0.84	6.5	0.84	0.76	9.0	0.85	0.80	8.9	0.93	0.86	7.1
ITEM 13	0.91	0.68	7.5	0.81	0.71	9.4	0.82	0.67	9.4	0.90	0.71	7.9
ITEM 14	0.76	0.68	10.2	0.51	0.69	12.9	0.57	0.69	12.3	0.72	0.72	10.7
ITEM 15	0.83	0.61	9.1	0.60	0.59	12.0	0.72	0.59	10.6	0.80	0.65	9.6
ITEM 16	0.84	0.77	9.1	0.60	0.68	12.0	0.62	0.69	11.8	0.80	0.79	9.6
ITEM 17	0.84	0.81	9.1	0.58	0.69	12.1	0.64	0.70	11.5	0.80	0.82	9.6
ITEM 18	0.68	0.51	11.1	0.57	0.53	12.3	0.58	0.53	12.2	0.66	0.52	11.3
ITEM 19	0.57	0.48	12.3	0.41	0.48	13.9	0.40	0.47	14.0	0.55	0.50	12.5
ITEM 20	0.86	0.82	8.8	0.63	0.73	11.6	0.66	0.81	11.4	0.82	0.83	9.3
ITEM 21	0.71	0.73	10.8	0.44	0.62	13.6	0.49	0.67	13.1	0.67	0.73	11.2
ITEM 22	0.42	0.42	13.8	0.27	0.39	15.4	0.28	0.33	15.3	0.40	0.43	14.0
ITEM 23	0.27	0.42	15.4	0.15	0.29	17.2	0.16	0.18	17.0	0.26	0.41	15.6
ITEM 24	0.71	0.70	10.8	0.43	0.59	13.7	0.54	0.62	12.6	0.68	0.70	11.2
ITEM 25	0.65	0.56	11.4	0.43	0.48	13.7	0.36	0.45	14.4	0.62	0.57	11.8
MEAN	0.76	0.65	9.9	0.57	0.61	12.2	0.60	0.61	11.9	0.73	0.67	10.3
S.D.	0.16	0.11	2.1	0.18	0.12	2.0	0.18	0.15	2.0	0.16	0.12	2.0

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	17.1	5.3	11.3	6.3	12.2	6.2	16.2	5.9
# RIGHT	18.1	4.5	13.2	5.2	14.1	5.0	17.4	4.9
# WRONG	4.2	4.3	7.7	6.0	7.5	5.8	4.8	4.8
# OMITS	1.3	1.9	1.5	2.4	1.2	2.1	1.3	2.0
# NOT REACHED	1.4	2.3	2.6	3.5	2.2	3.2	1.5	2.6

COEFFICIENT ALPHA	0.84	0.85	0.84	0.86
SAMPLE SIZE	11804	1889	676	15749
POPULATION ESTIMATE	2052880	231532	92233	2559029

NLS 19
LETTER (

	WHITE MALE			WHITE FEMALE			BLACK	
	P+	RBIS	DELTA	P+	PBIS	DELTA	P+	RBI
ITEM 1	0.92	0.62	7.5	0.92	0.59	7.4	0.81	0.7
ITEM 2	0.65	0.65	11.5	0.71	0.66	10.8	0.47	0.6
ITEM 3	0.86	0.61	8.6	0.91	0.55	7.6	0.73	0.5
ITEM 4	0.95	0.73	6.4	0.96	0.69	6.2	0.82	0.8
ITEM 5	0.71	0.73	10.8	0.77	0.77	10.0	0.43	0.6
ITEM 6	0.92	0.76	7.3	0.94	0.67	6.8	0.80	0.8
ITEM 7	0.71	0.74	10.7	0.79	0.76	9.8	0.54	0.7
ITEM 8	0.68	0.55	11.1	0.75	0.52	10.3	0.46	0.4
ITEM 9	0.67	0.65	11.2	0.73	0.66	10.6	0.45	0.5
ITEM 10	0.86	0.64	8.6	0.88	0.58	8.4	0.72	0.6
ITEM 11	0.79	0.66	9.8	0.82	0.64	9.4	0.61	0.6
ITEM 12	0.93	0.85	7.0	0.97	0.76	5.7	0.81	0.7
ITEM 13	0.90	0.71	7.9	0.93	0.60	7.1	0.78	0.8
ITEM 14	0.73	0.70	10.5	0.78	0.66	10.0	0.50	0.6
ITEM 15	0.83	0.64	9.2	0.84	0.59	9.1	0.61	0.5
ITEM 16	0.81	0.74	9.5	0.87	0.80	8.6	0.58	0.6
ITEM 17	0.81	0.80	9.4	0.86	0.80	8.7	0.57	0.7
ITEM 18	0.66	0.51	11.3	0.70	0.51	11.0	0.55	0.5
ITEM 19	0.55	0.49	12.5	0.60	0.47	12.0	0.36	0.4
ITEM 20	0.83	0.80	9.2	0.88	0.84	8.3	0.59	0.7
ITEM 21	0.69	0.72	11.1	0.73	0.73	10.5	0.41	0.6
ITEM 22	0.40	0.42	14.0	0.43	0.43	13.7	0.27	0.4
ITEM 23	0.27	0.43	15.5	0.28	0.42	15.3	0.15	0.2
ITEM 24	0.67	0.68	11.2	0.75	0.71	10.4	0.39	0.5
ITEM 25	0.62	0.57	11.7	0.68	0.53	11.1	0.40	0.4
MEAN	0.74	0.66	10.1	0.78	0.64	9.5	0.55	0.61
S.D.	0.16	0.11	2.1	0.16	0.12	2.2	0.18	0.1

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN
FORMULA SCORE	16.4	5.6	17.8	4.9	10.7
# RIGHT	17.5	4.7	18.8	4.1	12.7
# WRONG	4.7	4.6	3.8	3.9	8.1
# OMITS	1.2	2.0	1.3	1.9	1.3
# NOT REACHED	1.6	2.6	1.1	2.0	2.9

COEFFICIENT ALPHA	0.84	0.82	0.8
SAMPLE SIZE	5887	5835	82
POPULATION ESTIMATE	1023734	1015237	10291

972
GROUPS

MALE		BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
S	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
8	9.5	0.82	0.67	9.3	0.83	0.66	9.2	0.80	0.59	9.7
5	13.3	0.52	0.60	12.8	0.50	0.57	13.0	0.51	0.50	12.9
5	10.5	0.78	0.52	9.9	0.76	0.62	10.2	0.78	0.57	9.9
3	9.3	0.85	0.72	8.9	0.84	0.75	9.0	0.90	0.69	8.0
0	13.7	0.47	0.65	13.3	0.52	0.69	12.8	0.55	0.66	12.5
4	9.6	0.83	0.76	9.2	0.81	0.87	9.5	0.88	0.80	8.4
1	12.6	0.55	0.66	12.5	0.58	0.71	12.2	0.59	0.68	12.0
1	13.4	0.51	0.47	12.9	0.54	0.39	12.6	0.54	0.38	12.6
6	13.5	0.46	0.55	13.4	0.51	0.62	12.9	0.48	0.61	13.2
2	10.7	0.74	0.65	10.4	0.77	0.71	10.0	0.73	0.52	10.6
6	11.9	0.62	0.68	11.8	0.63	0.65	11.7	0.59	0.73	12.1
8	9.5	0.86	0.74	8.6	0.85	0.78	8.8	0.85	0.81	8.9
0	9.9	0.84	0.62	9.0	0.83	0.74	9.1	0.81	0.60	9.5
5	13.0	0.51	0.73	12.9	0.55	0.70	12.5	0.58	0.69	12.2
9	11.9	0.59	0.59	12.1	0.70	0.60	10.9	0.75	0.55	10.3
6	12.1	0.61	0.70	11.9	0.60	0.66	12.0	0.64	0.72	11.6
0	12.3	0.59	0.68	12.1	0.61	0.73	11.9	0.67	0.65	11.2
6	12.5	0.59	0.49	12.1	0.60	0.54	12.0	0.56	0.54	12.3
2	14.4	0.45	0.53	13.6	0.38	0.44	14.3	0.42	0.49	13.8
1	12.1	0.67	0.73	11.3	0.62	0.80	11.7	0.69	0.81	11.0
3	13.9	0.46	0.61	13.4	0.51	0.67	12.9	0.46	0.67	13.4
2	15.4	0.27	0.37	15.5	0.31	0.25	15.0	0.25	0.41	15.7
2	17.2	0.15	0.35	17.2	0.17	0.22	16.9	0.16	0.15	17.0
4	14.1	0.46	0.63	13.4	0.51	0.48	12.9	0.56	0.70	12.4
7	14.0	0.46	0.48	13.4	0.30	0.39	15.1	0.41	0.45	13.9
1	12.4	0.59	0.61	12.0	0.59	0.61	12.0	0.61	0.60	11.8
6	2.0	0.18	0.11	2.1	0.18	0.16	2.0	0.18	0.15	2.1

S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
6.3	11.8	6.2	11.9	6.1	12.5	6.1
5.1	13.6	5.1	13.7	5.0	14.4	5.0
6.1	7.3	5.8	7.4	5.9	7.7	5.6
2.2	1.7	2.6	1.2	2.2	1.2	1.9
3.7	2.4	3.4	2.7	3.6	1.8	2.7

5	0.85	0.84	0.84
3	1048	339	330
5	126309	45288	45883

APPENDIX C

HS&B 1980 Senior Item Analysis Tables

C1 1980 Vocabulary Male-Female

C2 1980 Vocabulary White-Black-Hispanic

C3 1980 Vocabulary White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

C4 1980 Reading Male-Female

C5 1980 Reading White-Black-Hispanic

C6 1980 Reading White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

C7 1980 Mathematics Male-Female

C8 1980 Mathematics White-Black-Hispanic

C9 1980 Mathematics White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

C10 1980 Visualization in Three Dimensions Male-Female

C11 1980 Visualization in Three Dimensions White-Black-Hispanic

C12 1980 Visualization in Three Dimensions White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

C1

HSB 1980 SENIORS
VOCABULARY

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.89	0.65	8.2	0.88	0.59	8.3	0.88	0.62	8.4
PART 1 ITEM 2	0.33	0.63	14.7	0.41	0.66	13.9	0.37	0.64	14.3
PART 1 ITEM 3	0.70	0.70	10.9	0.76	0.68	10.2	0.72	0.69	10.6
PART 1 ITEM 4	0.71	0.64	10.8	0.61	0.59	11.8	0.65	0.62	11.4
PART 1 ITEM 5	0.79	0.65	9.8	0.77	0.63	10.0	0.77	0.64	10.0
PART 1 ITEM 6	0.49	0.52	13.1	0.54	0.55	12.5	0.51	0.53	12.9
PART 1 ITEM 7	0.48	0.69	13.2	0.54	0.66	12.6	0.50	0.67	13.0
PART 1 ITEM 8	0.32	0.52	14.8	0.31	0.52	15.0	0.31	0.52	15.0
PART 1 ITEM 9	0.45	0.58	13.5	0.48	0.55	13.2	0.46	0.56	13.4
PART 1 ITEM 10	0.48	0.61	13.2	0.43	0.58	13.7	0.45	0.60	13.5
PART 1 ITEM 11	0.35	0.59	14.5	0.27	0.57	15.4	0.31	0.58	15.0
PART 1 ITEM 12	0.36	0.63	14.4	0.31	0.59	14.9	0.33	0.61	14.7
PART 1 ITEM 13	0.28	0.25	15.3	0.32	0.34	14.8	0.30	0.29	15.1
PART 1 ITEM 14	0.39	0.40	14.1	0.39	0.36	14.1	0.39	0.38	14.1
PART 1 ITEM 15	0.38	0.60	14.2	0.43	0.62	13.7	0.40	0.61	14.0
PART 2 ITEM 1	0.88	0.53	8.4	0.90	0.49	8.0	0.88	0.51	8.2
PART 2 ITEM 2	0.81	0.53	9.6	0.49	0.49	13.1	0.63	0.47	11.7
PART 2 ITEM 3	0.64	0.75	11.6	0.58	0.75	12.2	0.60	0.75	12.0
PART 2 ITEM 4	0.58	0.58	12.2	0.57	0.50	12.3	0.57	0.54	12.3
PART 2 ITEM 5	0.48	0.66	13.2	0.47	0.68	13.3	0.47	0.67	13.3
PART 2 ITEM 6	0.21	0.27	16.3	0.23	0.24	15.9	0.22	0.25	16.1
PART 2 ITEM 7	0.45	0.54	13.5	0.42	0.51	13.8	0.43	0.52	13.7
PART 2 ITEM 8	0.56	0.63	12.4	0.58	0.59	12.2	0.57	0.61	12.3
PART 2 ITEM 9	0.40	0.44	14.0	0.43	0.35	13.7	0.42	0.39	13.8
PART 2 ITEM 10	0.38	0.52	14.2	0.34	0.44	14.7	0.36	0.48	14.5
PART 2 ITEM 11	0.36	0.52	14.4	0.34	0.53	14.7	0.35	0.52	14.6
PART 2 ITEM 12	0.36	0.52	14.4	0.34	0.53	14.7	0.35	0.52	14.6
MEAN	0.50	0.56	12.9	0.49	0.54	13.1	0.49	0.55	13.1
S.D.	0.18	0.11	2.1	0.17	0.12	2.0	0.17	0.11	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	10.4	6.6	10.0	6.4	10.1	6.5
# RIGHT	13.4	5.4	13.0	5.3	13.1	5.4
# WRONG	11.7	5.7	12.2	5.6	12.1	5.6
# OMITS	1.3	2.5	1.2	2.5	1.3	2.5
# NOT REACHED P1	0.3	1.4	0.2	1.1	0.3	1.3
# NOT REACHED P2	0.4	1.2	0.3	1.1	0.4	1.2

COEFFICIENT ALPHA	0.83	0.82	0.82
SAMPLE SIZE	11381	12662	24945
POPULATION ESTIMATE	1218546	1356466	2667597

C2

HSB 1980 SENIORS
VOCABULARY

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.91	0.61	7.7	0.73	0.53	10.5	0.78	0.54	10.0	0.88	0.62	8.4
PART 1 ITEM 2	0.39	0.65	14.1	0.26	0.54	15.5	0.28	0.48	15.4	0.37	0.64	14.3
PART 1 ITEM 3	0.77	0.67	10.0	0.50	0.61	13.0	0.56	0.65	12.4	0.72	0.69	10.6
PART 1 ITEM 4	0.69	0.60	11.0	0.43	0.50	13.7	0.52	0.61	12.8	0.65	0.62	11.4
PART 1 ITEM 5	0.81	0.63	9.4	0.63	0.56	11.7	0.59	0.52	12.1	0.77	0.64	10.0
PART 1 ITEM 6	0.54	0.53	12.6	0.42	0.51	13.8	0.39	0.48	14.1	0.51	0.53	12.9
PART 1 ITEM 7	0.54	0.67	12.6	0.32	0.55	14.8	0.33	0.53	14.8	0.50	0.67	13.0
PART 1 ITEM 8	0.34	0.53	14.7	0.18	0.31	16.7	0.26	0.32	15.6	0.31	0.52	15.0
PART 1 ITEM 9	0.49	0.57	13.1	0.32	0.39	14.8	0.34	0.46	14.7	0.46	0.56	13.4
PART 1 ITEM 10	0.48	0.58	13.2	0.30	0.56	15.1	0.29	0.54	15.2	0.45	0.60	13.5
PART 1 ITEM 11	0.33	0.59	14.8	0.22	0.46	16.1	0.22	0.38	16.1	0.31	0.58	15.0
PART 1 ITEM 12	0.36	0.60	14.4	0.19	0.51	16.5	0.22	0.53	16.0	0.33	0.61	14.7
PART 1 ITEM 13	0.31	0.31	15.0	0.27	0.21	15.4	0.30	0.26	15.1	0.30	0.29	15.1
PART 1 ITEM 14	0.40	0.37	14.0	0.31	0.28	15.0	0.33	0.35	14.7	0.39	0.38	14.1
PART 1 ITEM 15	0.44	0.59	13.6	0.21	0.52	16.2	0.31	0.57	15.0	0.40	0.61	14.0
PART 2 ITEM 1	0.91	0.49	7.7	0.80	0.47	9.7	0.79	0.44	9.8	0.88	0.51	8.2
PART 2 ITEM 2	0.68	0.42	11.1	0.37	0.46	14.3	0.47	0.43	13.3	0.63	0.47	11.7
PART 2 ITEM 3	0.66	0.74	11.4	0.35	0.67	14.5	0.39	0.68	14.1	0.60	0.75	12.0
PART 2 ITEM 4	0.60	0.53	12.0	0.42	0.48	13.8	0.47	0.45	13.3	0.57	0.54	12.3
PART 2 ITEM 5	0.51	0.67	12.9	0.29	0.59	15.2	0.33	0.56	14.8	0.47	0.67	13.3
PART 2 ITEM 6	0.23	0.26	16.0	0.20	0.13	16.4	0.20	0.22	16.3	0.22	0.25	16.1
PART 2 ITEM 7	0.46	0.53	13.4	0.29	0.32	15.2	0.32	0.34	14.9	0.43	0.52	13.7
PART 2 ITEM 8	0.60	0.59	11.9	0.37	0.57	14.3	0.45	0.57	13.5	0.57	0.61	12.3
PART 2 ITEM 9	0.43	0.39	13.7	0.34	0.30	14.6	0.34	0.28	14.7	0.42	0.39	13.8
PART 2 ITEM 10	0.38	0.48	14.3	0.27	0.41	15.5	0.27	0.45	15.4	0.36	0.48	14.5
PART 2 ITEM 11	0.36	0.56	14.4	0.29	0.28	15.2	0.32	0.31	14.9	0.35	0.52	14.6
PART 2 ITEM 12	0.36	0.56	14.4	0.28	0.26	15.3	0.28	0.36	15.3	0.35	0.52	14.6
MEAN	0.52	0.54	12.7	0.36	0.45	14.6	0.38	0.46	14.2	0.49	0.55	13.1
S.D.	0.18	0.11	2.1	0.15	0.13	1.7	0.15	0.12	1.6	0.17	0.11	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	11.0	6.4	5.6	5.2	6.5	5.4	10.1	6.5
# RIGHT	13.8	5.3	9.4	4.3	10.2	4.5	13.1	5.4
# WRONG	11.4	5.5	15.3	5.2	14.9	5.1	12.1	5.6
# OMITS	1.2	2.5	1.3	2.6	1.2	2.7	1.3	2.5
# NOT REACHED P1	0.2	1.1	0.5	1.8	0.3	1.5	0.3	1.3
# NOT REACHED P2	0.3	1.1	0.4	1.5	0.3	1.4	0.4	1.2
COEFFICIENT ALPHA	0.82		0.71		0.73		0.82	
SAMPLE SIZE	17869		3175		2743		24949	
POPULATION ESTIMATE	2111414		285180		155275		2667597	

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                                                                                      HSB 1980 SE
                                                                                         VOCABULA

                                WHITE MALE               WHITE FEMALE             BLACK M
                            ----------------        -----------------        ----------
                            P+     RBIS   DELTA      P+     RBIS   DELTA      P+     RBIS
PART 1 ITEM  1             0.91    0.64     7.6     0.91    0.58     7.7     0.76    0.59
PART 1 ITEM  2             0.35    0.65    14.5     0.44    0.67    13.6     0.24    0.54
PART 1 ITEM  3             0.73    0.69    10.5     0.81    0.66     9.5     0.53    0.61
PART 1 ITEM  4             0.75    0.62    10.3     0.65    0.58    11.5     0.48    0.52
PART 1 ITEM  5             0.82    0.65     9.4     0.81    0.62     9.4     0.67    0.61
PART 1 ITEM  6             0.51    0.51    12.9     0.57    0.54    12.3     0.41    0.50
PART 1 ITEM  7             0.51    0.70    12.9     0.58    0.66    12.2     0.32    0.54
PART 1 ITEM  8             0.34    0.54    14.6     0.33    0.52    14.7     0.20    0.30
PART 1 ITEM  9             0.48    0.59    13.2     0.51    0.55    12.9     0.33    0.42
PART 1 ITEM 10             0.50    0.60    13.0     0.47    0.56    13.3     0.36    0.56
PART 1 ITEM 11             0.37    0.60    14.3     0.29    0.59    15.2     0.27    0.48
PART 1 ITEM 12             0.39    0.62    14.1     0.34    0.58    14.6     0.18    0.61
PART 1 ITEM 13             0.29    0.27    15.3     0.33    0.36    14.8     0.25    0.17
PART 1 ITEM 14             0.40    0.40    14.0     0.41    0.35    13.9     0.31    0.38
PART 1 ITEM 15             0.41    0.59    13.9     0.46    0.60    13.4     0.21    0.53
PART 2 ITEM  1             0.90    0.51     7.9     0.92    0.47     7.5     0.78    0.52
PART 2 ITEM  2             0.85    0.46     8.8     0.53    0.45    12.7     0.53    0.54
PART 2 ITEM  3             0.69    0.74    11.1     0.64    0.74    11.6     0.41    0.66
PART 2 ITEM  4             0.60    0.57    12.0     0.60    0.49    12.0     0.44    0.53
PART 2 ITEM  5             0.51    0.67    12.9     0.51    0.67    12.9     0.35    0.57
PART 2 ITEM  6             0.21    0.29    16.2     0.24    0.24    15.9     0.18    0.10
PART 2 ITEM  7             0.47    0.55    13.3     0.45    0.52    13.5     0.31    0.36
PART 2 ITEM  8             0.59    0.62    12.1     0.62    0.56    11.8     0.40    0.59
PART 2 ITEM  9             0.42    0.45    13.8     0.45    0.35    13.5     0.32    0.33
PART 2 ITEM 10             0.40    0.52    14.0     0.35    0.44    14.5     0.28    0.41
PART 2 ITEM 11             0.38    0.55    14.3     0.35    0.58    14.6     0.28    0.38
PART 2 ITEM 12             0.37    0.55    14.3     0.35    0.57    14.5     0.30    0.23

   MEAN                    0.52    0.56    12.6     0.52    0.54    12.7     0.37    0.47
   S.D.                    0.19    0.11     2.2     0.18    0.11     2.1     0.16    0.14

SUMMARY:
                               MEAN      S.D.          MEAN      S.D.          MEAN      S
FORMULA SCORE                  11.2      6.5           10.9      6.3            6.3      5
# RIGHT                        14.0      5.4           13.8      5.2           10.0      4
# WRONG                        11.2      5.5           11.5      5.4           14.7      5
# OMITS                         1.2      2.5            1.2      2.4            1.3      2
# NOT REACHED P1                0.2      1.2            0.2      1.0            0.6      1
# NOT REACHED P2                0.3      1.1            0.3      1.0            0.5      1

COEFFICIENT ALPHA                  0.83                    0.81                   0.74
SAMPLE SIZE                        8482                    9060                   1195
POPULATION ESTIMATE              987898                 1084229                 110126
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NIORS
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ALE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
10.2	0.73	0.49	10.5	0.80	0.56	9.7	0.79	0.52	9.7
15.8	0.28	0.58	15.3	0.25	0.44	15.7	0.31	0.51	15.0
12.7	0.51	0.61	12.9	0.55	0.64	12.5	0.58	0.66	12.2
13.2	0.42	0.47	13.8	0.56	0.63	12.4	0.50	0.61	13.0
11.2	0.61	0.53	11.9	0.61	0.50	11.9	0.57	0.57	12.3
13.9	0.43	0.54	13.7	0.35	0.51	14.5	0.44	0.50	13.6
14.8	0.33	0.58	14.8	0.32	0.54	14.9	0.35	0.50	14.5
16.4	0.17	0.31	16.9	0.25	0.33	15.7	0.26	0.31	15.6
14.8	0.32	0.40	14.8	0.31	0.54	15.0	0.38	0.40	14.2
14.5	0.27	0.55	15.5	0.31	0.54	15.0	0.28	0.53	15.3
15.5	0.19	0.42	16.5	0.24	0.39	15.9	0.20	0.36	16.4
16.6	0.19	0.48	16.5	0.26	0.53	15.6	0.20	0.51	16.4
15.8	0.30	0.25	15.1	0.30	0.20	15.1	0.31	0.30	14.9
14.9	0.32	0.38	14.9	0.32	0.41	14.9	0.35	0.29	14.6
16.2	0.22	0.51	16.1	0.30	0.52	15.1	0.34	0.65	14.6
10.0	0.83	0.45	9.2	0.78	0.45	9.9	0.80	0.43	9.6
12.7	0.26	0.39	15.6	0.63	0.48	11.6	0.32	0.42	14.9
13.9	0.33	0.65	14.8	0.42	0.66	13.8	0.38	0.69	14.2
13.6	0.41	0.43	13.9	0.46	0.47	13.4	0.49	0.43	13.1
14.6	0.26	0.61	15.5	0.31	0.53	14.9	0.36	0.59	14.5
16.6	0.22	0.17	16.2	0.20	0.18	16.4	0.21	0.28	16.2
14.9	0.28	0.30	15.3	0.32	0.40	14.9	0.31	0.29	14.9
14.0	0.37	0.55	14.4	0.42	0.55	13.8	0.51	0.58	12.9
14.8	0.35	0.28	14.5	0.33	0.28	14.7	0.35	0.27	14.5
15.3	0.26	0.41	15.6	0.29	0.50	15.3	0.27	0.41	15.5
15.4	0.30	0.23	15.1	0.32	0.35	14.9	0.31	0.32	15.0
15.1	0.28	0.27	15.4	0.27	0.37	15.4	0.28	0.37	15.3
14.3	0.35	0.44	14.6	0.39	0.46	14.2	0.39	0.46	14.2
1.7	0.16	0.13	1.7	0.16	0.12	1.7	0.15	0.13	1.7

.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
.4	5.4	5.0	6.7	5.5	6.6	5.4
.5	9.3	4.1	10.4	4.5	10.3	4.5
.3	15.7	5.1	14.8	5.2	14.9	5.1
.6	1.3	2.6	1.2	2.7	1.1	2.5
.8	0.4	1.6	0.3	1.3	0.3	1.3
.6	0.4	1.4	0.3	1.2	0.4	1.5

0.69	0.74	0.73
1728	1198	1421
152555	72819	72521

C3

C4

HSB 1980 SENIORS
READING

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.80	0.61	9.6	0.81	0.59	9.5	0.80	0.61	9.6
ITEM 2	0.60	0.70	12.0	0.61	0.68	11.9	0.60	0.69	12.0
ITEM 3	0.83	0.61	9.1	0.89	0.57	8.1	0.86	0.59	8.7
ITEM 4	0.66	0.60	11.4	0.72	0.60	10.6	0.69	0.60	11.1
ITEM 5	0.70	0.63	11.0	0.73	0.63	10.6	0.71	0.64	10.8
ITEM 6	0.76	0.72	10.2	0.72	0.63	10.7	0.73	0.67	10.5
ITEM 7	0.50	0.65	13.0	0.45	0.67	13.5	0.47	0.66	13.3
ITEM 8	0.54	0.67	12.6	0.55	0.71	12.5	0.54	0.69	12.6
ITEM 9	0.44	0.56	13.6	0.46	0.50	13.4	0.45	0.53	13.5
ITEM 10	0.51	0.57	12.9	0.59	0.61	12.1	0.55	0.59	12.5
ITEM 11	0.47	0.53	13.3	0.41	0.50	13.9	0.43	0.51	13.7
ITEM 12	0.79	0.67	9.8	0.83	0.56	9.2	0.80	0.62	9.6
ITEM 13	0.60	0.72	12.0	0.57	0.72	12.3	0.58	0.72	12.2
ITEM 14	0.32	0.53	14.9	0.27	0.54	15.5	0.29	0.54	15.2
ITEM 15	0.18	0.42	16.6	0.19	0.50	16.5	0.18	0.46	16.6
ITEM 16	0.50	0.64	13.0	0.50	0.65	13.0	0.49	0.65	13.1
ITEM 17	0.36	0.41	14.4	0.37	0.40	14.3	0.36	0.41	14.4
ITEM 18	0.70	0.60	10.9	0.67	0.57	11.2	0.68	0.59	11.1
ITEM 19	0.41	0.48	13.9	0.38	0.46	14.2	0.40	0.47	14.1
ITEM 20	0.50	0.57	13.0	0.41	0.51	13.9	0.45	0.53	13.5
MEAN	0.56	0.60	12.4	0.56	0.58	12.3	0.55	0.59	12.4
S.D.	0.17	0.09	1.9	0.19	0.08	2.1	0.18	0.08	2.0

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	8.9	5.3	8.9	5.0	8.8	5.2
# RIGHT	11.0	4.3	11.0	4.1	10.9	4.2
# WRONG	8.5	4.2	8.5	4.0	8.6	4.1
# OMITS	0.1	0.6	0.2	0.6	0.1	0.6
# NOT REACHED	0.3	1.4	0.3	1.3	0.3	1.4

COEFFICIENT ALPHA	0.80	0.78	0.79
SAMPLE SIZE	11362	12631	24852
POPULATION ESTIMATE	1216150	1353321	2661074

C5

HSB 1980 SENIORS
READING

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	PBIS	DELTA	P+	PBIS	DELTA	P+	PBIS	DELTA
ITEM 1	0.83	0.59	9.2	0.70	0.57	10.9	0.66	0.57	11.3	0.83	0.61	9.6
ITEM 2	0.63	0.69	11.7	0.47	0.65	13.3	0.46	0.63	13.4	0.60	0.69	12.0
ITEM 3	0.89	0.58	8.3	0.78	0.52	9.9	0.78	0.56	9.9	0.86	0.59	8.7
ITEM 4	0.71	0.59	10.8	0.61	0.61	11.9	0.56	0.56	12.4	0.69	0.60	11.1
ITEM 5	0.74	0.61	10.4	0.57	0.65	12.3	0.55	0.62	12.4	0.71	0.64	10.8
ITEM 6	0.77	0.66	10.1	0.57	0.63	12.3	0.58	0.60	12.2	0.73	0.67	10.5
ITEM 7	0.52	0.64	12.8	0.26	0.61	15.6	0.31	0.64	15.0	0.47	0.66	13.3
ITEM 8	0.58	0.67	12.1	0.33	0.63	14.8	0.38	0.60	14.2	0.54	0.69	12.6
ITEM 9	0.48	0.52	13.2	0.33	0.45	14.7	0.29	0.52	15.2	0.45	0.53	13.5
ITEM 10	0.58	0.58	12.2	0.42	0.50	13.9	0.41	0.51	13.9	0.55	0.59	12.5
ITEM 11	0.46	0.50	13.4	0.29	0.43	15.2	0.31	0.48	14.9	0.43	0.51	13.7
ITEM 12	0.83	0.61	9.2	0.70	0.60	10.9	0.69	0.59	11.0	0.80	0.62	9.6
ITEM 13	0.63	0.71	11.7	0.35	0.69	14.5	0.40	0.63	14.1	0.58	0.72	12.2
ITEM 14	0.32	0.52	14.9	0.15	0.54	17.2	0.16	0.46	16.9	0.29	0.54	15.2
ITEM 15	0.20	0.48	16.4	0.13	0.23	17.4	0.13	0.24	17.6	0.18	0.46	16.6
ITEM 16	0.54	0.63	12.6	0.30	0.59	15.1	0.30	0.59	15.1	0.49	0.65	13.1
ITEM 17	0.38	0.40	14.2	0.30	0.47	15.2	0.30	0.41	15.1	0.36	0.41	14.4
ITEM 18	0.72	0.58	10.7	0.51	0.50	12.9	0.54	0.48	12.6	0.68	0.59	11.1
ITEM 19	0.42	0.49	13.8	0.28	0.29	15.3	0.29	0.27	15.2	0.40	0.47	14.1
ITEM 20	0.48	0.55	13.2	0.30	0.32	15.1	0.33	0.37	14.8	0.45	0.53	13.5
MEAN	0.58	0.58	12.1	0.42	0.52	13.9	0.42	0.52	13.9	0.55	0.59	12.4
S.D.	0.18	0.08	2.0	0.18	0.12	2.0	0.17	0.11	1.9	0.18	0.08	2.0

SUMMARY:	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	9.5	5.0	5.3	4.5	5.5	4.6	8.8	5.2
# RIGHT	11.6	4.1	8.0	3.7	8.2	3.7	10.9	4.2
# WRONG	8.1	4.0	10.8	3.9	11.0	3.8	8.6	4.1
# OMITS	0.1	0.6	0.2	0.8	0.1	0.6	0.1	0.6
# NOT REACHED	0.2	1.1	1.0	2.4	0.6	1.8	0.3	1.4
COEFFICIENT ALPHA	0.78		0.73		0.73		0.79	
SAMPLE SIZE	17833		3166		2736		24892	
POPULATION ESTIMATE	2106518		284505		155026		2661074	

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                                                                     HSB 1980
                                                                          READI

                             WHITE MALE               WHITE FEMALE               BLACK
                         ------------------       ------------------       ----------
                          P+    RBIS  DELTA        P+    RBIS  DELTA        P+    RBIS
         ITEM  1         0.83   0.59    9.2       0.84   0.57    9.1       0.70   0.5
         ITEM  2         0.63   0.69   11.7       0.64   0.68   11.6       0.48   0.72
         ITEM  3         0.85   0.61    8.9       0.91   0.55    7.7       0.77   0.51
         ITEM  4         0.67   0.59   11.2       0.75   0.59   10.3       0.60   0.6
         ITEM  5         0.72   0.61   10.6       0.76   0.61   10.2       0.58   0.6
         ITEM  6         0.79   0.71    9.8       0.75   0.62   10.3       0.60   0.6
         ITEM  7         0.54   0.64   12.6       0.50   0.64   13.0       0.33   0.5
         ITEM  8         0.57   0.66   12.3       0.60   0.70   12.0       0.35   0.66
         ITEM  9         0.46   0.56   13.4       0.50   0.47   13.0       0.33   0.4
         ITEM 10         0.53   0.57   12.7       0.62   0.61   11.8       0.40   0.50
         ITEM 11         0.49   0.53   13.1       0.44   0.48   13.6       0.34   0.42
         ITEM 12         0.81   0.66    9.5       0.85   0.54    8.8       0.69   0.68
         ITEM 13         0.64   0.71   11.6       0.62   0.71   11.8       0.40   0.69
         ITEM 14         0.34   0.53   14.6       0.30   0.51   15.1       0.18   0.50
         ITEM 15         0.19   0.45   16.5       0.20   0.52   16.3       0.15   0.19
         ITEM 16         0.53   0.62   12.6       0.54   0.63   12.6       0.33   0.63
         ITEM 17         0.37   0.40   14.3       0.39   0.39   14.1       0.30   0.45
         ITEM 18         0.73   0.59   10.6       0.71   0.56   10.8       0.54   0.52
         ITEM 19         0.43   0.49   13.7       0.40   0.48   14.0       0.29   0.32
         ITEM 20         0.53   0.58   12.7       0.44   0.53   13.6       0.33   0.41

           MEAN          0.58   0.59   12.1       0.59   0.57   12.0       0.43   0.54
           S.D.          0.17   0.08    1.9       0.19   0.08    2.2       0.17   0.14

         SUMMARY:

                             MEAN     S.D.            MEAN     S.D.            MEAN
         FORMULA SCORE        9.5      5.2             9.7      4.9             5.7
         # RIGHT             11.6      4.2            11.7      3.9             8.4
         # WRONG              8.1      4.1             8.0      3.9            10.5
         # OMITS              0.1      0.6             0.1      0.6             0.2
         # NOT REACHED        0.2      1.1             0.2      1.0             0.9

         COEFFICIENT ALPHA          0.79                    0.77                    0.7
         SAMPLE SIZE                8466                    9039                    115
         POPULATION ESTIMATE      985458                 1081745                  10988
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ENIORS
G

MALE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
10.9	0.73	0.58	10.6	0.66	0.59	11.4	0.69	0.54	11.1
13.2	0.48	0.60	13.2	0.46	0.66	13.4	0.46	0.61	13.4
10.1	0.80	0.52	9.6	0.75	0.60	10.3	0.83	0.52	9.2
12.0	0.62	0.57	11.7	0.54	0.60	12.6	0.58	0.53	12.2
12.2	0.59	0.63	12.1	0.54	0.68	12.6	0.59	0.55	12.1
12.0	0.55	0.58	12.5	0.63	0.61	12.0	0.59	0.59	12.1
14.8	0.22	0.63	16.1	0.32	0.66	14.8	0.30	0.62	15.1
14.6	0.31	0.64	15.0	0.39	0.60	14.1	0.39	0.63	14.1
14.8	0.34	0.43	14.6	0.29	0.53	15.2	0.29	0.54	15.2
14.0	0.43	0.53	13.7	0.38	0.51	14.3	0.46	0.57	13.4
14.7	0.27	0.46	15.4	0.35	0.48	14.5	0.28	0.50	15.3
11.0	0.72	0.52	10.6	0.70	0.64	10.9	0.71	0.55	10.7
14.0	0.33	0.69	14.7	0.42	0.65	13.8	0.38	0.62	14.2
16.6	0.12	0.59	17.6	0.18	0.47	16.7	0.15	0.42	17.1
17.2	0.12	0.28	17.6	0.12	0.10	17.7	0.13	0.36	17.5
14.8	0.29	0.56	15.2	0.29	0.54	15.2	0.33	0.62	14.8
15.1	0.30	0.46	15.0	0.28	0.45	15.3	0.32	0.36	14.8
12.6	0.49	0.47	13.1	0.55	0.49	12.5	0.53	0.46	12.7
15.2	0.29	0.27	15.3	0.31	0.32	15.0	0.27	0.24	15.4
14.7	0.29	0.25	15.3	0.38	0.40	14.2	0.28	0.33	15.3
13.7	0.42	0.51	13.9	0.43	0.53	13.8	0.43	0.51	13.8
1.9	0.19	0.12	2.2	0.17	0.14	1.8	0.19	0.11	2.1

S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
4.8	5.3	4.3	5.6	4.8	5.7	4.4
3.9	8.0	3.5	8.3	3.9	8.4	3.6
4.0	10.9	3.8	11.0	4.0	10.9	3.6
0.6	0.3	0.8	0.2	0.7	0.1	0.5
2.3	0.8	2.2	0.5	1.6	0.6	1.8

0.71	0.74	0.71
1725	1199	1415
152176	72726	72487

C7

HSB 1980 SENIORS
MATHEMATICS

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.97	0.52	5.6	0.97	0.49	5.5	0.97	0.51	5.6
PART 1 ITEM 2	0.86	0.44	8.7	0.80	0.39	9.6	0.83	0.42	9.3
PART 1 ITEM 3	0.78	0.59	9.9	0.72	0.51	10.7	0.74	0.55	10.4
PART 1 ITEM 4	0.80	0.52	9.6	0.74	0.47	10.4	0.77	0.50	10.1
PART 1 ITEM 5	0.73	0.79	10.6	0.68	0.76	11.1	0.70	0.78	11.0
PART 1 ITEM 6	0.77	0.54	10.0	0.72	0.48	10.6	0.74	0.52	10.4
PART 1 ITEM 7	0.76	0.70	10.2	0.72	0.62	10.7	0.73	0.66	10.5
PART 1 ITEM 8	0.93	0.31	7.1	0.94	0.38	6.9	0.93	0.35	7.1
PART 1 ITEM 9	0.68	0.58	11.2	0.68	0.55	11.2	0.67	0.56	11.2
PART 1 ITEM 10	0.63	0.68	11.7	0.56	0.66	12.4	0.58	0.68	12.1
PART 1 ITEM 11	0.54	0.52	12.6	0.42	0.49	13.9	0.47	0.52	13.3
PART 1 ITEM 12	0.72	0.68	10.6	0.67	0.65	11.3	0.69	0.67	11.0
PART 1 ITEM 13	0.61	0.74	11.8	0.61	0.70	11.9	0.61	0.72	11.9
PART 1 ITEM 14	0.69	0.55	11.1	0.63	0.59	11.7	0.65	0.58	11.4
PART 1 ITEM 15	0.59	0.48	12.0	0.56	0.43	12.4	0.57	0.45	12.3
PART 1 ITEM 16	0.54	0.77	12.6	0.54	0.73	12.6	0.53	0.75	12.7
PART 1 ITEM 17	0.56	0.66	12.4	0.54	0.55	12.6	0.55	0.60	12.5
PART 1 ITEM 18	0.52	0.60	12.8	0.43	0.46	13.7	0.47	0.54	13.3
PART 1 ITEM 19	0.64	0.57	11.6	0.58	0.53	12.2	0.60	0.55	12.0
PART 1 ITEM 20	0.63	0.73	11.7	0.61	0.64	11.8	0.61	0.69	11.8
PART 1 ITEM 21	0.45	0.73	13.5	0.41	0.73	13.9	0.42	0.73	13.8
PART 1 ITEM 22	0.54	0.73	12.6	0.45	0.72	13.5	0.49	0.73	13.1
PART 1 ITEM 23	0.52	0.27	12.8	0.48	0.27	13.2	0.50	0.27	13.0
PART 1 ITEM 24	0.43	0.61	13.7	0.35	0.52	14.5	0.39	0.57	14.1
PART 1 ITEM 25	0.38	0.39	14.2	0.37	0.25	14.4	0.37	0.31	14.3
PART 2 ITEM 1	0.57	0.65	12.3	0.50	0.62	13.0	0.53	0.64	12.7
PART 2 ITEM 2	0.51	0.66	12.9	0.34	0.57	14.7	0.41	0.62	13.9
PART 2 ITEM 3	0.75	0.77	10.4	0.74	0.69	10.4	0.74	0.73	10.5
PART 2 ITEM 4	0.83	0.39	9.1	0.82	0.31	9.3	0.82	0.36	9.3
PART 2 ITEM 5	0.27	0.34	15.4	0.21	0.29	16.2	0.24	0.32	15.8
PART 2 ITEM 6	0.48	0.52	13.2	0.44	0.44	13.6	0.45	0.48	13.5
PART 2 ITEM 7	0.46	0.42	13.4	0.51	0.33	12.9	0.48	0.37	13.2
MEAN	0.63	0.58	11.5	0.59	0.53	12.0	0.60	0.55	11.8
S.D.	0.16	0.14	2.0	0.17	0.14	2.2	0.17	0.14	2.1

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	16.3	8.5	14.4	7.9	15.1	8.2
# RIGHT	20.1	6.5	18.6	6.0	19.1	6.3
# WRONG	11.4	6.2	12.6	5.9	12.1	6.1
# OMITS	0.3	1.0	0.4	1.3	0.4	1.2
# NOT REACHED P1	0.1	1.2	0.2	1.1	0.2	1.2
# NOT REACHED P2	0.1	0.8	0.2	1.0	0.2	0.9

COEFFICIENT ALPHA	0.86	0.83	0.85
SAMPLE SIZE	11329	12552	24771
POPULATION ESTIMATE	1214615	1346431	2651891

C8

HSB 1980 SENIORS
MATHEMATICS

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.98	0.44	5.0	0.92	0.50	7.3	0.93	0.52	7.2	0.97	0.51	5.6
PART 1 ITEM 2	0.84	0.41	9.0	0.74	0.34	10.4	0.78	0.38	10.0	0.83	0.42	9.3
PART 1 ITEM 3	0.78	0.55	9.9	0.58	0.39	12.2	0.59	0.48	12.1	0.76	0.55	10.4
PART 1 ITEM 4	0.79	0.49	9.7	0.64	0.41	11.6	0.67	0.47	11.2	0.77	0.50	10.1
PART 1 ITEM 5	0.74	0.76	10.4	0.46	0.70	13.4	0.52	0.75	12.8	0.70	0.78	11.0
PART 1 ITEM 6	0.77	0.52	10.0	0.60	0.34	11.9	0.62	0.41	11.8	0.74	0.52	10.4
PART 1 ITEM 7	0.78	0.65	9.9	0.52	0.55	12.8	0.58	0.59	12.2	0.73	0.66	10.5
PART 1 ITEM 8	0.95	0.24	6.6	0.87	0.44	8.5	0.87	0.49	8.5	0.93	0.35	7.1
PART 1 ITEM 9	0.70	0.57	10.9	0.56	0.44	12.4	0.55	0.46	12.5	0.67	0.56	11.2
PART 1 ITEM 10	0.62	0.67	11.8	0.39	0.60	14.1	0.45	0.60	13.5	0.59	0.68	12.1
PART 1 ITEM 11	0.50	0.49	13.0	0.29	0.49	15.2	0.37	0.50	14.3	0.47	0.52	13.3
PART 1 ITEM 12	0.72	0.66	10.7	0.56	0.61	12.4	0.57	0.67	12.3	0.69	0.67	11.0
PART 1 ITEM 13	0.65	0.70	11.5	0.39	0.70	14.1	0.43	0.70	13.7	0.61	0.72	11.9
PART 1 ITEM 14	0.70	0.53	11.0	0.43	0.61	13.7	0.49	0.64	13.1	0.65	0.58	11.4
PART 1 ITEM 15	0.59	0.46	12.1	0.46	0.29	13.4	0.48	0.40	13.2	0.57	0.45	12.3
PART 1 ITEM 16	0.56	0.75	12.4	0.36	0.68	14.4	0.41	0.70	13.9	0.53	0.75	12.7
PART 1 ITEM 17	0.57	0.62	12.3	0.47	0.49	13.3	0.44	0.55	13.6	0.55	0.60	12.5
PART 1 ITEM 18	0.50	0.52	13.0	0.34	0.52	14.7	0.34	0.50	14.6	0.47	0.54	13.3
PART 1 ITEM 19	0.63	0.54	11.7	0.45	0.48	13.5	0.48	0.47	13.3	0.60	0.55	12.0
PART 1 ITEM 20	0.66	0.67	11.3	0.39	0.57	14.1	0.42	0.61	13.8	0.61	0.69	11.8
PART 1 ITEM 21	0.46	0.72	13.4	0.21	0.67	16.3	0.27	0.71	15.5	0.42	0.73	13.8
PART 1 ITEM 22	0.53	0.72	12.7	0.24	0.57	15.9	0.35	0.63	14.6	0.49	0.73	13.1
PART 1 ITEM 23	0.51	0.25	12.9	0.39	0.20	14.1	0.43	0.28	13.7	0.50	0.27	13.0
PART 1 ITEM 24	0.42	0.56	13.8	0.24	0.49	15.9	0.26	0.52	15.6	0.39	0.57	14.1
PART 1 ITEM 25	0.38	0.36	14.3	0.36	0.14	14.4	0.32	0.11	14.9	0.37	0.31	14.3
PART 2 ITEM 1	0.56	0.65	12.4	0.37	0.47	14.3	0.41	0.54	13.9	0.53	0.64	12.7
PART 2 ITEM 2	0.44	0.64	13.6	0.25	0.38	15.6	0.31	0.44	15.0	0.41	0.62	13.9
PART 2 ITEM 3	0.78	0.72	10.0	0.56	0.61	12.4	0.56	0.67	12.4	0.74	0.73	10.5
PART 2 ITEM 4	0.84	0.35	9.1	0.77	0.31	10.1	0.80	0.40	9.7	0.82	0.36	9.3
PART 2 ITEM 5	0.25	0.33	15.7	0.17	0.24	16.7	0.18	0.17	16.7	0.24	0.32	15.8
PART 2 ITEM 6	0.47	0.50	13.3	0.36	0.29	14.5	0.37	0.31	14.3	0.45	0.48	13.5
PART 2 ITEM 7	0.49	0.39	13.1	0.45	0.24	13.5	0.43	0.29	13.7	0.48	0.37	13.2
MEAN	0.63	0.54	11.4	0.46	0.46	13.4	0.49	0.50	13.0	0.60	0.55	11.8
S.D.	0.17	0.14	2.2	0.18	0.15	2.1	0.17	0.15	2.0	0.17	0.14	2.1

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	16.3	8.0	9.2	6.9	10.3	7.6	15.1	8.2
# RIGHT	20.1	6.1	14.6	5.3	15.5	5.9	19.1	6.3
# WRONG	11.3	5.5	16.0	5.4	15.6	5.8	12.1	6.1
# OMITS	0.3	1.1	0.6	1.4	0.4	1.2	0.4	1.2
# NOT REACHED P1	0.1	1.0	0.4	2.0	0.3	1.7	0.2	1.2
# NOT REACHED P2	0.1	0.8	0.4	1.5	0.2	1.0	0.2	0.9

COEFFICIENT ALPHA	0.85	0.77	0.82	0.85
SAMPLE SIZE	17760	3157	2708	24771
POPULATION ESTIMATE	2100477	284781	152369	2651891

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                                                                              HSB 1980
                                                                                 MATHE

                               WHITE MALE             WHITE FEMALE             BLAC
                          -----------------        -----------------        --------
                           P+    RBIS  DELTA        P+    RBIS  DELTA        P+    RB
PART 1 ITEM  1            0.98  0.50    5.1        0.98  0.38    4.7        0.93  0.
PART 1 ITEM  2            0.87  0.43    8.5        0.81  0.38    9.4        0.75  0.
PART 1 ITEM  3            0.82  0.58    9.4        0.75  0.51   10.3        0.60  0.
PART 1 ITEM  4            0.83  0.50    9.2        0.77  0.47   10.1        0.68  0.
PART 1 ITEM  5            0.76  0.78   10.1        0.73  0.75   10.6        0.52  0.
PART 1 ITEM  6            0.80  0.54    9.7        0.75  0.49   10.3        0.64  0.
PART 1 ITEM  7            0.80  0.70    9.7        0.77  0.59   10.1        0.56  0.
PART 1 ITEM  8            0.94  0.23    6.9        0.96  0.27    6.2        0.90  0.
PART 1 ITEM  9            0.70  0.60   10.9        0.70  0.55   10.9        0.57  0.
PART 1 ITEM 10            0.65  0.68   11.4        0.59  0.65   12.0        0.44  0.
PART 1 ITEM 11            0.57  0.50   12.3        0.44  0.47   13.6        0.36  0.
PART 1 ITEM 12            0.75  0.67   10.3        0.69  0.65   11.0        0.60  0.
PART 1 ITEM 13            0.65  0.72   11.4        0.65  0.68   11.4        0.41  0.
PART 1 ITEM 14            0.72  0.49   10.7        0.68  0.55   11.2        0.50  0.
PART 1 ITEM 15            0.61  0.48   11.8        0.58  0.44   12.2        0.48  0.
PART 1 ITEM 16            0.56  0.78   12.4        0.57  0.73   12.3        0.37  0.
PART 1 ITEM 17            0.57  0.67   12.2        0.56  0.58   12.4        0.47  0.
PART 1 ITEM 18            0.55  0.58   12.5        0.45  0.44   13.5        0.36  0.
PART 1 ITEM 19            0.66  0.56   11.3        0.60  0.52   12.0        0.47  0.
PART 1 ITEM 20            0.68  0.72   11.2        0.66  0.63   11.4        0.39  0.
PART 1 ITEM 21            0.48  0.72   13.2        0.45  0.72   13.5        0.22  0.
PART 1 ITEM 22            0.58  0.72   12.2        0.49  0.71   13.1        0.28  0.
PART 1 ITEM 23            0.53  0.25   12.7        0.50  0.26   13.0        0.42  0.
PART 1 ITEM 24            0.47  0.60   13.3        0.39  0.50   14.2        0.27  0.
PART 1 ITEM 25            0.39  0.44   14.1        0.37  0.28   14.4        0.35  0.
PART 2 ITEM  1            0.60  0.66   12.0        0.52  0.63   12.8        0.40  0.
PART 2 ITEM  2            0.54  0.69   12.6        0.36  0.59   14.5        0.32  0.
PART 2 ITEM  3            0.78  0.77    9.9        0.78  0.68    9.9        0.58  0.
PART 2 ITEM  4            0.84  0.38    9.0        0.83  0.32    9.2        0.77  0.
PART 2 ITEM  5            0.29  0.35   15.2        0.22  0.29   16.1        0.19  0.
PART 2 ITEM  6            0.49  0.56   13.1        0.46  0.45   13.4        0.41  0.
PART 2 ITEM  7            0.47  0.43   13.3        0.51  0.36   12.9        0.40  0.

   MEAN                   0.65  0.57   11.2        0.61  0.52   11.6        0.45  0.
   S.D.                   0.16  0.15    2.1        0.17  0.14    2.3        0.18  0.

SUMMARY:
                             MEAN     S.D.            MEAN     S.D.            MEAN
FORMULA SCORE                17.3      8.2            15.5      7.6            10.3
# RIGHT                      20.9      6.2            19.5      5.8            15.4
# WRONG                      10.6      6.0            11.8      5.7            15.4
# OMITS                       0.3      1.0             0.4      1.2             0.5
# NOT REACHED P1              0.1      1.1             0.1      0.8             0.4
# NOT REACHED P2              0.1      0.8             0.2      0.8             0.3

COEFFICIENT ALPHA                 0.86                    0.83                    0.
SAMPLE SIZE                       8444                    8988                    11
[illegible]                       [illegible]             [illegible]             [illegible]
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SENIORS
MATICS

K MALE		BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
IS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
48	7.1	0.92	0.55	7.3	0.94	0.50	6.7	0.93	0.52	7.2
35	10.4	0.73	0.34	10.5	0.81	0.39	9.5	0.74	0.37	10.4
45	12.0	0.59	0.37	12.1	0.62	0.51	11.8	0.57	0.44	12.3
47	11.1	0.61	0.35	11.9	0.71	0.53	10.8	0.64	0.38	11.5
70	12.8	0.44	0.70	13.6	0.56	0.77	12.4	0.51	0.74	12.9
61	11.5	0.58	0.25	12.2	0.65	0.45	11.5	0.60	0.35	12.0
58	12.4	0.49	0.50	13.1	0.60	0.64	12.0	0.57	0.53	12.3
68	8.0	0.85	0.40	8.8	0.89	0.47	8.1	0.88	0.50	8.4
65	12.3	0.56	0.44	12.4	0.57	0.46	12.3	0.54	0.45	12.6
55	13.6	0.36	0.55	14.4	0.51	0.58	12.9	0.41	0.60	13.9
48	14.5	0.24	0.46	15.8	0.42	0.50	13.8	0.34	0.47	14.6
64	12.0	0.54	0.60	12.6	0.60	0.69	12.3	0.57	0.65	12.3
71	13.9	0.38	0.68	14.2	0.45	0.75	13.6	0.44	0.65	13.6
61	13.0	0.38	0.60	14.2	0.54	0.66	12.6	0.47	0.59	13.3
76	13.2	0.45	0.21	13.5	0.53	0.45	13.0	0.44	0.41	13.6
71	14.3	0.35	0.68	14.5	0.41	0.69	13.9	0.41	0.75	13.9
57	13.3	0.47	0.40	13.3	0.43	0.62	13.7	0.45	0.50	13.5
64	14.5	0.34	0.41	14.7	0.38	0.56	14.2	0.33	0.41	14.8
69	13.3	0.44	0.50	13.6	0.51	0.47	12.9	0.46	0.46	13.4
64	14.1	0.41	0.53	13.9	0.44	0.60	13.6	0.43	0.60	13.7
70	16.0	0.20	0.62	16.4	0.30	0.68	15.1	0.26	0.71	15.6
65	15.3	0.21	0.49	16.2	0.40	0.62	14.0	0.31	0.66	15.0
20	13.9	0.38	0.20	14.2	0.46	0.34	13.4	0.40	0.18	14.0
65	15.4	0.21	0.54	16.3	0.28	0.59	15.4	0.25	0.42	15.7
09	14.5	0.38	0.21	14.2	0.31	0.21	15.0	0.32	0.01	14.9
67	14.0	0.36	0.45	14.4	0.42	0.59	13.8	0.40	0.51	14.0
62	14.9	0.21	0.30	16.2	0.35	0.48	14.5	0.26	0.39	15.6
65	12.2	0.56	0.58	12.4	0.55	0.74	12.5	0.59	0.61	12.1
08	10.1	0.77	0.22	10.1	0.80	0.49	9.7	0.80	0.31	9.6
26	16.5	0.16	0.24	17.0	0.20	0.18	16.4	0.16	0.16	17.0
78	13.9	0.33	0.31	14.8	0.38	0.34	14.3	0.37	0.28	14.3
4	14.0	0.49	0.16	13.1	0.41	0.33	13.9	0.45	0.28	13.5
9	13.1	0.45	0.43	13.5	0.51	0.53	12.8	0.48	0.47	13.2
6	2.1	0.19	0.16	2.1	0.17	0.14	2.0	0.19	0.17	2.1

S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
7.4	8.7	6.4	11.3	8.1	9.9	7.1
5.8	14.1	4.9	16.3	6.2	15.1	5.5
5.7	16.3	5.1	15.0	6.1	15.8	5.5
1.3	0.7	1.5	0.4	1.2	0.5	1.3
2.0	0.4	1.7	0.2	1.1	0.3	2.0
1.1	0.4	1.5	0.2	0.8	0.2	1.1

81	0.73	0.84	0.78
92	1717	1186	1401
[illegible]	[illegible]	[illegible]	[illegible]

C10

HSB 1980 SENIORS
VISUALIZATION IN THREE DIMENSIONS

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.94	0.50	6.7	0.94	0.47	6.9	0.94	0.49	6.9
ITEM 2	0.76	0.60	10.1	0.70	0.55	10.9	0.73	0.58	10.6
ITEM 3	0.66	0.63	11.3	0.62	0.60	11.8	0.64	0.61	11.6
ITEM 4	0.49	0.61	13.1	0.45	0.58	13.5	0.46	0.59	13.4
ITEM 5	0.53	0.63	12.7	0.45	0.63	13.5	0.49	0.64	13.1
ITEM 6	0.48	0.61	13.2	0.40	0.58	14.0	0.44	0.60	13.6
ITEM 7	0.70	0.64	10.9	0.67	0.57	11.2	0.68	0.61	11.1
ITEM 8	0.49	0.63	13.1	0.45	0.60	13.5	0.47	0.62	13.3
ITEM 9	0.63	0.68	11.7	0.63	0.63	11.7	0.63	0.65	11.7
ITEM 10	0.48	0.65	13.2	0.39	0.56	14.1	0.43	0.61	13.7
ITEM 11	0.37	0.64	14.3	0.24	0.48	15.8	0.30	0.58	15.1
ITEM 12	0.40	0.62	14.0	0.35	0.56	14.6	0.37	0.59	14.3
ITEM 13	0.29	0.54	15.2	0.33	0.28	14.8	0.31	0.30	15.0
ITEM 14	0.38	0.60	14.2	0.31	0.55	15.0	0.34	0.58	14.6
ITEM 15	0.48	0.54	13.2	0.41	0.39	13.9	0.44	0.47	13.6
ITEM 16	0.05	0.38	19.4	0.04	0.28	15.9	0.05	0.34	19.6
MEAN	0.51	0.58	12.9	0.46	0.52	13.4	0.48	0.55	13.2
S.D.	0.20	0.09	2.6	0.20	0.11	2.7	0.20	0.10	2.6

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	6.2	4.1	5.3	3.6	5.7	3.9
# RIGHT	8.1	3.3	7.3	2.9	7.7	3.1
# WRONG	7.5	3.3	8.2	3.0	7.9	3.2
# OMITS	0.3	0.9	0.3	1.0	0.3	1.0
# NOT REACHED	0.1	0.8	0.1	0.8	0.1	0.8
COEFFICIENT ALPHA	0.73		0.65		0.70	
SAMPLE SIZE	10977		12055		23865	
POPULATION ESTIMATE	1180134		1255416		2561037	

C11

HSB 1980 SENIORS
VISUALIZATION IN THREE DIMENSIONS

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.95	0.46	6.4	0.86	0.45	8.6	0.90	0.48	8.0	0.94	0.49	6.9
ITEM 2	0.75	0.58	10.3	0.58	0.51	12.2	0.65	0.56	11.4	0.73	0.58	10.6
ITEM 3	0.66	0.60	11.3	0.45	0.56	13.5	0.57	0.60	12.3	0.64	0.61	11.6
ITEM 4	0.49	0.59	13.1	0.33	0.54	14.7	0.39	0.52	14.1	0.46	0.59	13.4
ITEM 5	0.52	0.62	12.8	0.30	0.62	15.1	0.40	0.60	14.1	0.49	0.64	13.1
ITEM 6	0.46	0.60	13.4	0.29	0.52	15.2	0.37	0.53	14.3	0.44	0.60	13.6
ITEM 7	0.70	0.60	10.9	0.54	0.57	12.5	0.62	0.59	11.8	0.68	0.61	11.1
ITEM 8	0.50	0.60	13.0	0.27	0.64	15.5	0.37	0.61	14.3	0.47	0.62	13.3
ITEM 9	0.66	0.65	11.4	0.43	0.59	13.7	0.56	0.61	12.4	0.63	0.65	11.7
ITEM 10	0.45	0.61	13.5	0.30	0.51	15.1	0.38	0.51	14.2	0.43	0.61	13.7
ITEM 11	0.32	0.58	14.9	0.20	0.45	16.4	0.23	0.46	16.0	0.30	0.58	15.1
ITEM 12	0.39	0.59	14.2	0.26	0.44	15.6	0.31	0.55	15.0	0.37	0.59	14.3
ITEM 13	0.31	0.32	15.0	0.31	0.19	14.9	0.29	0.24	15.2	0.31	0.30	15.0
ITEM 14	0.36	0.58	14.4	0.23	0.47	16.0	0.28	0.52	15.3	0.34	0.58	14.6
ITEM 15	0.45	0.49	13.5	0.39	0.41	14.1	0.39	0.43	14.2	0.44	0.47	13.6
ITEM 16	0.05	0.37	19.7	0.05	0.13	19.6	0.05	0.25	19.8	0.05	0.34	19.6
MEAN	0.50	0.55	13.0	0.36	0.47	14.5	0.42	0.50	13.9	0.48	0.55	13.2
S.D.	0.20	0.09	2.7	0.18	0.14	2.2	0.19	0.11	2.4	0.20	0.10	2.6

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	6.1	3.8	3.4	3.2	4.5	3.5	5.7	3.9
# RIGHT	8.0	3.1	5.8	2.6	6.7	2.8	7.7	3.1
# WRONG	7.6	3.2	9.7	2.9	8.9	3.0	7.9	3.2
# OMITS	0.3	1.0	0.4	1.1	0.2	0.8	0.3	1.0
# NOT REACHED	0.1	0.8	0.2	1.0	0.2	0.9	0.1	0.8
COEFFICIENT ALPHA	0.70		0.57		0.63		0.70	
SAMPLE SIZE	17264		2917		2601		23865	
POPULATION ESTIMATE	2045686		261403		146998		2561037	

HSB 1980
VISUALIZATION IN T

	WHITE MALE			WHITE FEMALE			BLAC	
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBI
ITEM 1	0.95	0.49	6.3	0.95	0.44	6.4	0.88	0.4
ITEM 2	0.78	0.59	9.9	0.72	0.55	10.6	0.62	0.5
ITEM 3	0.68	0.62	11.1	0.64	0.59	11.5	0.49	0.5
ITEM 4	0.51	0.61	12.9	0.47	0.58	13.3	0.37	0.5
ITEM 5	0.56	0.62	12.4	0.48	0.62	13.2	0.34	0.6
ITEM 6	0.50	0.60	13.0	0.42	0.58	13.8	0.33	0.5
ITEM 7	0.71	0.63	10.7	0.65	0.57	11.0	0.57	0.6
ITEM 8	0.52	0.61	12.8	0.48	0.58	13.2	0.30	0.6
ITEM 9	0.65	0.68	11.4	0.66	0.63	11.4	0.43	0.6
ITEM 10	0.50	0.65	13.0	0.41	0.56	13.9	0.33	0.5
ITEM 11	0.39	0.64	14.1	0.25	0.49	15.6	0.23	0.5
ITEM 12	0.41	0.63	13.9	0.36	0.56	14.4	0.28	0.4
ITEM 13	0.30	0.36	15.1	0.32	0.31	14.8	0.28	0.1
ITEM 14	0.40	0.60	14.0	0.32	0.55	14.8	0.26	0.5
ITEM 15	0.49	0.55	13.1	0.42	0.41	13.8	0.42	0.4
ITEM 16	0.05	0.40	19.4	0.04	0.32	19.9	0.04	0.2
MEAN	0.53	0.58	12.7	0.48	0.52	13.2	0.39	0.5
S.D.	0.20	0.09	2.7	0.21	0.10	2.8	0.18	0.1

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN
FORMULA SCORE	6.6	4.0	5.6	3.6	3.8
# RIGHT	8.4	3.3	7.6	2.9	6.1
# WRONG	7.2	3.3	8.0	3.0	9.3
# OMITS	0.3	0.9	0.3	1.0	0.3
# NOT REACHED	0.1	0.8	0.1	0.8	0.2

COEFFICIENT ALPHA	0.73	0.65	0.
SAMPLE SIZE	8228	8713	11
POPULATION ESTIMATE	960478	1046318	1038

SENIORS
HREE DIMENSIONS

	MALE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
S	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
5	8.4	0.86	0.45	8.7	0.90	0.48	7.9	0.90	0.49	8.0
3	11.8	0.55	0.47	12.5	0.73	0.59	10.9	0.62	0.53	11.7
7	13.1	0.42	0.56	13.8	0.61	0.61	11.9	0.54	0.59	12.6
5	14.3	0.31	0.52	15.0	0.38	0.55	14.2	0.41	0.53	13.9
5	14.6	0.27	0.58	15.5	0.45	0.59	13.5	0.35	0.61	14.6
3	14.8	0.27	0.50	15.5	0.42	0.55	13.8	0.33	0.48	14.8
3	12.3	0.53	0.54	12.7	0.65	0.64	11.5	0.62	0.53	11.8
5	15.1	0.24	0.63	15.9	0.38	0.66	14.2	0.38	0.56	14.2
6	13.7	0.43	0.55	13.7	0.56	0.63	12.4	0.57	0.59	12.3
8	14.7	0.27	0.40	15.4	0.43	0.54	13.7	0.33	0.45	14.8
8	16.0	0.18	0.32	16.6	0.29	0.58	15.2	0.17	0.25	16.9
1	15.3	0.23	0.43	15.9	0.34	0.59	14.6	0.29	0.53	15.2
8	15.4	0.34	0.23	14.6	0.26	0.28	15.6	0.33	0.23	14.8
2	15.5	0.21	0.41	16.3	0.30	0.56	15.1	0.27	0.44	15.5
8	13.8	0.38	0.34	14.3	0.40	0.48	14.0	0.38	0.35	14.2
9	20.0	0.06	0.13	19.4	0.05	0.25	19.6	0.04	0.20	20.0
1	14.3	0.35	0.44	14.7	0.45	0.53	13.6	0.41	0.46	14.1
4	2.3	0.18	0.13	2.2	0.19	0.11	2.4	0.20	0.13	2.5

S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
3.5	3.0	2.9	4.9	3.8	4.2	3.2
2.9	5.5	2.4	7.1	3.0	6.5	2.6
3.0	5.9	2.7	8.5	3.2	9.2	2.7
1.0	0.4	1.2	0.2	0.7	0.3	0.9
1.0	0.2	0.9	0.2	1.0	0.1	0.9

64	0.48	0.68	0.55
27	1568	1139	1350
20	137976	70329	67637

APPENDIX D

HS&B 1980 Sophomore Item Analysis Tables

D1 1980 Vocabulary Male-Female
D2 1980 Vocabulary White-Black-Hispanic
D3 1980 Vocabulary White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
D4 1980 Reading Male-Female
D5 1980 Reading White-Black-Hispanic
D6 1980 Reading White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
D7 1980 Mathematics Male-Female
D8 1980 Mathematics White-Black-Hispanic
D9 1980 Mathematics White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
D10 1980 Science Male-Female
D11 1980 Science White-Black-Hispanic
D12 1980 Science White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
D13 1980 Writing Male-Female
D14 1980 Writing White-Black-Hispanic
D15 1980 Writing White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
D16 1980 Civics Education Male-Female
D17 1980 Civics Education White-Black-Hispanic
D18 1980 Civics Education White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

D1

HSB 1980 SOPHOMORES
VOCABULARY

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.74	0.73	10.5	0.76	0.72	10.2	0.75	0.72	10.3
ITEM 2	0.88	0.73	8.4	0.80	0.74	9.6	0.84	0.73	9.1
ITEM 3	0.67	0.75	11.2	0.66	0.76	11.4	0.66	0.75	11.3
ITEM 4	0.80	0.71	9.6	0.78	0.71	10.0	0.79	0.71	9.8
ITEM 5	0.77	0.75	10.0	0.79	0.69	9.7	0.78	0.72	9.9
ITEM 6	0.53	0.69	12.7	0.46	0.68	13.4	0.50	0.68	13.0
ITEM 7	0.53	0.69	12.7	0.60	0.75	12.0	0.56	0.72	12.4
ITEM 8	0.77	0.74	10.0	0.66	0.69	11.4	0.71	0.71	10.7
ITEM 9	0.55	0.69	12.4	0.64	0.70	11.6	0.60	0.69	12.0
ITEM 10	0.59	0.66	12.1	0.51	0.59	12.9	0.55	0.62	12.5
ITEM 11	0.68	0.68	11.2	0.65	0.65	11.5	0.66	0.67	11.3
ITEM 12	0.74	0.63	10.4	0.59	0.55	12.0	0.67	0.58	11.3
ITEM 13	0.37	0.60	14.3	0.43	0.63	13.7	0.40	0.61	14.0
ITEM 14	0.28	0.59	15.3	0.29	0.64	15.2	0.29	0.61	15.3
ITEM 15	0.24	0.30	15.8	0.23	0.32	16.0	0.24	0.31	15.9
ITEM 16	0.43	0.48	13.7	0.46	0.51	13.4	0.45	0.49	13.5
ITEM 17	0.36	0.61	14.5	0.36	0.58	14.5	0.36	0.59	14.5
ITEM 18	0.28	0.48	15.4	0.24	0.44	15.8	0.26	0.46	15.6
ITEM 19	0.27	0.14	15.4	0.30	0.19	15.1	0.29	0.16	15.2
ITEM 20	0.22	0.27	16.0	0.20	0.31	16.3	0.21	0.29	16.2
ITEM 21	0.28	0.48	15.3	0.33	0.58	14.7	0.31	0.53	15.0
MEAN	0.52	0.59	12.7	0.51	0.59	12.9	0.52	0.59	12.8
S.D.	0.21	0.17	2.3	0.19	0.15	2.1	0.20	0.16	2.2

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	8.6	5.2	8.3	5.4	8.5	5.3
# RIGHT	10.9	4.3	10.7	4.4	10.8	4.3
# WRONG	9.1	4.4	9.5	4.5	9.3	4.5
# OMITS	0.7	1.9	0.7	1.8	0.7	1.9
# NOT REACHED	0.3	1.4	0.1	0.9	0.2	1.2
COEFFICIENT ALPHA	0.80		0.81		0.80	
SAMPLE SIZE	12115		12718		24833	
POPULATION ESTIMATE	1881143		1885300		3766443	

D2

HSB 1980 SOPHOMORES
VOCABULARY

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.82	0.70	9.4	0.52	0.63	12.8	0.58	0.66	12.1	0.75	0.72	10.3
ITEM 2	0.90	0.71	8.0	0.63	0.62	11.7	0.72	0.67	10.7	0.84	0.73	9.1
ITEM 3	0.73	0.75	10.6	0.47	0.65	13.3	0.50	0.65	13.0	0.66	0.75	11.3
ITEM 4	0.87	0.63	8.4	0.52	0.68	12.8	0.60	0.65	12.0	0.79	0.71	9.8
ITEM 5	0.84	0.69	9.0	0.61	0.62	11.9	0.62	0.67	11.7	0.78	0.72	9.9
ITEM 6	0.56	0.69	12.4	0.30	0.55	15.1	0.35	0.56	14.6	0.50	0.68	13.0
ITEM 7	0.62	0.72	11.8	0.36	0.59	14.4	0.43	0.63	13.7	0.56	0.72	12.4
ITEM 8	0.79	0.69	9.8	0.47	0.60	13.3	0.53	0.63	12.7	0.71	0.71	10.7
ITEM 9	0.65	0.68	11.4	0.42	0.64	13.8	0.44	0.60	13.6	0.60	0.69	12.0
ITEM 10	0.61	0.60	11.9	0.34	0.50	14.7	0.43	0.55	13.7	0.55	0.62	12.5
ITEM 11	0.71	0.68	10.8	0.55	0.52	12.5	0.50	0.57	13.0	0.66	0.67	11.3
ITEM 12	0.72	0.56	10.6	0.49	0.44	13.1	0.53	0.50	12.7	0.67	0.58	11.3
ITEM 13	0.45	0.63	13.5	0.28	0.48	15.3	0.29	0.50	15.2	0.40	0.61	14.0
ITEM 14	0.32	0.62	14.8	0.18	0.53	16.6	0.18	0.46	16.7	0.29	0.61	15.3
ITEM 15	0.25	0.36	15.8	0.21	0.17	16.3	0.21	0.17	16.2	0.24	0.31	15.9
ITEM 16	0.48	0.47	13.2	0.32	0.53	14.9	0.37	0.45	14.4	0.45	0.49	13.5
ITEM 17	0.39	0.62	14.1	0.26	0.46	15.6	0.26	0.45	15.6	0.36	0.59	14.5
ITEM 18	0.29	0.48	15.3	0.17	0.36	16.8	0.20	0.30	16.4	0.26	0.46	15.6
ITEM 19	0.29	0.18	15.2	0.28	0.17	15.3	0.30	0.18	15.1	0.29	0.16	15.2
ITEM 20	0.21	0.36	16.2	0.22	0.19	16.1	0.21	0.19	16.3	0.21	0.29	16.2
ITEM 21	0.34	0.55	14.7	0.20	0.41	16.4	0.24	0.43	15.9	0.31	0.53	15.0
MEAN	0.56	0.59	12.2	0.37	0.49	14.4	0.40	0.50	14.1	0.52	0.59	12.8
S.D.	0.22	0.14	2.5	0.14	0.15	1.6	0.16	0.16	1.7	0.20	0.16	2.2

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	9.7	5.0	4.7	4.6	5.5	4.7	8.5	5.3
# RIGHT	11.8	4.1	7.7	3.8	8.4	3.9	10.8	4.3
# WRONG	8.4	4.2	12.1	4.3	11.6	4.3	9.3	4.5
# OMITS	0.7	1.8	0.8	2.0	0.7	1.9	0.7	1.9
# NOT REACHED	0.2	1.0	0.4	1.7	0.3	1.6	0.2	1.2

COEFFICIENT ALPHA	0.79	0.72	0.73	0.80
SAMPLE SIZE	16850	3066	4202	24833
POPULATION ESTIMATE	2739849	451380	483544	3766443

HSB 1980 SOPHOMORES
VOCABULARY

	WHITE MALE			WHITE FEMALE			BLACK MALE			BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.80	0.71	9.6	0.83	0.69	9.1	0.52	0.65	12.8	0.52	0.62	12.8	0.58	0.66	12.2	0.59	0.67	12.1
ITEM 2	0.93	0.72	7.2	0.86	0.71	8.6	0.71	0.62	10.7	0.55	0.62	12.5	0.77	0.65	10.1	0.66	0.69	11.4
ITEM 3	0.73	0.75	10.5	0.73	0.76	10.6	0.51	0.66	12.9	0.44	0.64	13.6	0.50	0.65	13.0	0.50	0.66	13.0
ITEM 4	0.88	0.64	8.3	0.87	0.63	8.6	0.57	0.67	12.3	0.48	0.69	13.2	0.63	0.64	11.7	0.55	0.65	12.5
ITEM 5	0.83	0.74	9.2	0.35	0.65	8.8	0.61	0.66	11.8	0.60	0.59	11.9	0.61	0.68	11.9	0.64	0.67	11.5
ITEM 6	0.60	0.69	12.0	0.52	0.68	12.8	0.35	0.57	14.5	0.26	0.51	15.6	0.36	0.57	14.4	0.32	0.53	14.8
ITEM 7	0.58	0.70	12.2	0.66	0.74	11.3	0.35	0.56	14.5	0.37	0.63	14.3	0.42	0.59	13.8	0.44	0.68	13.6
ITEM 8	0.84	0.71	9.0	0.73	0.66	10.5	0.55	0.62	12.5	0.41	0.56	13.9	0.59	0.66	12.1	0.46	0.61	13.4
ITEM 9	0.61	0.69	11.9	0.70	0.69	11.0	0.40	0.66	14.0	0.44	0.64	13.6	0.41	0.60	13.9	0.48	0.62	13.2
ITEM 10	0.66	0.63	11.4	0.56	0.59	12.4	0.33	0.56	14.8	0.34	0.45	14.6	0.45	0.57	13.5	0.41	0.52	13.9
ITEM 11	0.73	0.70	10.6	0.69	0.67	11.0	0.56	0.53	12.4	0.54	0.50	12.6	0.51	0.59	12.9	0.49	0.55	13.1
ITEM 12	0.81	0.58	9.5	0.64	0.56	11.5	0.52	0.53	12.8	0.46	0.35	13.4	0.59	0.57	12.0	0.44	0.42	13.6
ITEM 13	0.41	0.62	13.9	0.48	0.64	13.2	0.27	0.49	15.5	0.29	0.48	15.2	0.27	0.48	15.5	0.31	0.52	15.0
ITEM 14	0.32	0.61	14.9	0.33	0.63	14.8	0.19	0.51	16.5	0.17	0.55	16.8	0.19	0.40	16.6	0.17	0.53	16.8
ITEM 15	0.25	0.36	15.7	0.24	0.36	15.8	0.21	0.15	16.2	0.21	0.20	16.3	0.22	0.12	16.1	0.20	0.24	16.4
ITEM 16	0.46	0.47	13.4	0.50	0.48	13.0	0.33	0.51	14.8	0.31	0.56	14.9	0.34	0.40	14.7	0.40	0.52	14.0
ITEM 17	0.39	0.65	14.1	0.39	0.60	14.1	0.28	0.46	15.4	0.24	0.45	15.8	0.25	0.45	15.8	0.28	0.45	15.4
ITEM 18	0.31	0.50	15.0	0.26	0.45	15.5	0.19	0.34	16.5	0.16	0.38	17.0	0.20	0.31	16.4	0.19	0.28	16.5
ITEM 19	0.27	0.15	15.4	0.30	0.21	15.0	0.28	0.17	15.4	0.29	0.17	15.2	0.29	0.18	15.2	0.32	0.18	14.9
ITEM 20	0.22	0.35	16.1	0.20	0.37	16.3	0.24	0.16	15.8	0.20	0.21	16.4	0.22	0.18	16.0	0.19	0.19	16.5
ITEM 21	0.31	0.51	15.0	0.37	0.59	14.3	0.20	0.36	16.4	0.19	0.45	16.5	0.22	0.38	16.1	0.26	0.49	15.6
MEAN	0.57	0.59	12.1	0.56	0.59	12.3	0.39	0.50	14.2	0.36	0.49	14.6	0.41	0.49	14.0	0.40	0.51	14.1
S.D.	0.23	0.15	2.7	0.21	0.14	2.4	0.16	0.16	1.7	0.14	0.15	1.5	0.17	0.17	1.8	0.15	0.16	1.6

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	9.8	4.9	9.5	5.1	5.1	4.7	4.3	4.5	5.7	4.6	5.3	4.8
# RIGHT	11.9	4.0	11.7	4.1	8.0	3.8	7.4	3.7	8.5	3.8	8.2	3.9
# WRONG	8.2	4.1	8.6	4.2	11.6	4.3	12.6	4.1	11.4	4.3	11.9	4.2
# OMITS	0.7	1.9	0.6	1.7	0.8	2.0	0.7	2.1	0.7	2.0	0.6	1.9
# NOT REACHED	0.2	1.1	0.1	0.8	0.5	2.0	0.3	1.4	0.4	1.8	0.2	1.3

COEFFICIENT ALPHA	0.78	0.79	0.73	0.70	0.72	0.74
SAMPLE SIZE	8271	8579	1387	1679	2094	2108
POPULATION ESTIMATE	1350054	1389794	214947	236434	266877	216667

D4

HSB 1980 SOPHOMORES
READING

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.92	0.59	7.5	0.91	0.56	7.5	0.91	0.57	7.5
ITEM 2	0.78	0.60	9.9	0.79	0.62	9.8	0.78	0.61	9.9
ITEM 3	0.73	0.61	10.5	0.74	0.56	10.4	0.74	0.58	10.5
ITEM 5	0.61	0.65	11.8	0.54	0.63	12.6	0.58	0.64	12.2
ITEM 6	0.49	0.54	13.1	0.50	0.60	13.0	0.50	0.57	13.0
ITEM 7	0.44	0.53	13.6	0.43	0.56	13.7	0.44	0.54	13.6
ITEM 8	0.40	0.65	14.0	0.33	0.61	14.8	0.36	0.63	14.4
ITEM 9	0.16	0.35	17.0	0.16	0.48	17.0	0.16	0.41	17.0
ITEM 10	0.43	0.53	13.7	0.51	0.59	12.9	0.47	0.55	13.3
ITEM 11	0.32	0.45	14.9	0.29	0.46	15.3	0.30	0.46	15.1
ITEM 12	0.70	0.66	10.9	0.78	0.57	10.0	0.74	0.61	10.5
ITEM 13	0.49	0.69	13.1	0.47	0.71	13.3	0.48	0.70	13.2
ITEM 14	0.65	0.68	11.5	0.62	0.64	11.8	0.63	0.66	11.6
ITEM 15	0.35	0.66	14.6	0.33	0.61	14.8	0.34	0.64	14.7
ITEM 16	0.43	0.61	13.7	0.46	0.67	13.4	0.44	0.64	13.6
ITEM 17	0.27	0.50	15.5	0.30	0.48	15.1	0.29	0.49	15.3
ITEM 18	0.40	0.60	14.0	0.32	0.61	14.9	0.36	0.60	14.4
ITEM 19	0.22	0.37	16.1	0.19	0.34	16.5	0.21	0.35	16.3
ITEM 20	0.45	0.63	13.6	0.47	0.62	13.3	0.46	0.63	13.4
MEAN	0.49	0.57	13.1	0.48	0.57	13.2	0.48	0.57	13.1
S.D.	0.19	0.10	2.2	0.20	0.08	2.4	0.20	0.09	2.3

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	6.7	4.7	6.6	4.7	6.7	4.7
# RIGHT	9.0	3.9	9.0	3.8	9.0	3.8
# WRONG	9.3	3.8	9.4	3.8	9.4	3.8
# OMITS	0.1	0.5	0.1	0.6	0.1	0.6
# NOT REACHED	0.5	1.8	0.5	1.6	0.5	1.7

	MALE	FEMALE	TOTAL
COEFFICIENT ALPHA	0.77	0.76	0.77
SAMPLE SIZE	12100	12706	24806
POPULATION ESTIMATE	1880855	1885110	3765965

D5

HSB 1980 SOPHOMORES
READING

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.94	0.55	6.7	0.84	0.52	9.0	0.84	0.56	8.9	0.91	0.57	7.5
ITEM 2	0.83	0.60	9.2	0.67	0.55	11.2	0.64	0.57	11.6	0.78	0.61	9.9
ITEM 3	0.77	0.59	10.0	0.65	0.49	11.4	0.62	0.49	11.8	0.74	0.58	10.5
ITEM 5	0.62	0.64	11.7	0.46	0.59	13.4	0.45	0.56	13.5	0.58	0.64	12.2
ITEM 6	0.54	0.55	12.6	0.38	0.58	14.2	0.35	0.52	14.5	0.50	0.57	13.0
ITEM 7	0.48	0.53	13.3	0.32	0.47	14.8	0.33	0.49	14.8	0.44	0.54	13.6
ITEM 8	0.40	0.64	14.0	0.26	0.48	15.6	0.24	0.54	15.9	0.36	0.63	14.4
ITEM 9	0.17	0.46	16.9	0.13	0.35	17.4	0.14	0.18	17.4	0.16	0.41	17.0
ITEM 10	0.51	0.55	12.9	0.36	0.48	14.4	0.36	0.46	14.4	0.47	0.55	13.3
ITEM 11	0.32	0.47	14.8	0.22	0.37	16.1	0.26	0.35	15.6	0.30	0.46	15.1
ITEM 12	0.78	0.60	9.9	0.62	0.58	11.7	0.60	0.56	12.0	0.74	0.61	10.5
ITEM 13	0.53	0.70	12.7	0.30	0.64	15.1	0.35	0.58	14.5	0.48	0.70	13.2
ITEM 14	0.68	0.65	11.1	0.46	0.60	13.4	0.49	0.58	13.1	0.63	0.66	11.6
ITEM 15	0.38	0.62	14.2	0.21	0.59	16.2	0.22	0.57	16.1	0.34	0.64	14.7
ITEM 16	0.49	0.64	13.1	0.29	0.59	15.2	0.31	0.52	15.0	0.44	0.64	13.6
ITEM 17	0.31	0.49	15.0	0.23	0.40	16.0	0.19	0.39	16.5	0.29	0.49	15.3
ITEM 18	0.40	0.62	14.1	0.24	0.39	15.9	0.26	0.50	15.6	0.36	0.60	14.4
ITEM 19	0.21	0.38	16.2	0.16	0.21	17.0	0.18	0.19	16.7	0.21	0.35	16.3
ITEM 20	0.51	0.61	12.9	0.29	0.57	15.2	0.31	0.55	15.0	0.46	0.63	13.4
MEAN	0.52	0.57	12.7	0.37	0.50	14.4	0.38	0.48	14.4	0.48	0.57	13.1
S.D.	0.20	0.08	2.4	0.19	0.11	2.1	0.18	0.12	2.0	0.20	0.09	2.3

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	7.5	4.7	4.1	3.8	4.1	3.9	6.7	4.7
# RIGHT	9.7	3.8	6.8	3.2	7.0	3.2	9.0	3.8
# WRONG	8.8	3.7	10.7	3.6	11.2	3.4	9.4	3.8
# OMITS	0.1	0.5	0.2	0.9	0.2	0.7	0.1	0.6
# NOT REACHED	0.3	1.3	1.2	2.7	0.7	2.0	0.5	1.7
COEFFICIENT ALPHA	0.76		0.66		0.64		0.77	
SAMPLE SIZE	16827		3072		4191		24806	
POPULATION ESTIMATE	2737044		452794		484196		3765965	

HSB 1980 SOPHO
READING

	WHITE MALE			WHITE FEMALE			BLACK MA	
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS
ITEM 1	0.94	0.58	6.8	0.94	0.52	6.7	0.85	0.53
ITEM 2	0.82	0.58	9.3	0.83	0.61	9.1	0.67	0.54
ITEM 3	0.77	0.62	10.0	0.77	0.56	10.0	0.64	0.53
ITEM 5	0.66	0.63	11.3	0.59	0.64	12.1	0.51	0.62
ITEM 6	0.53	0.52	12.7	0.55	0.57	12.5	0.39	0.58
ITEM 7	0.48	0.52	13.2	0.47	0.53	13.3	0.35	0.48
ITEM 8	0.44	0.66	13.6	0.37	0.62	14.4	0.30	0.52
ITEM 9	0.17	0.40	16.9	0.17	0.51	16.9	0.14	0.25
ITEM 10	0.46	0.54	13.4	0.56	0.58	12.4	0.33	0.48
ITEM 11	0.34	0.47	14.6	0.30	0.47	15.0	0.23	0.42
ITEM 12	0.75	0.66	10.3	0.81	0.55	9.4	0.58	0.61
ITEM 13	0.54	0.70	12.6	0.52	0.71	12.8	0.31	0.63
ITEM 14	0.70	0.67	10.9	0.67	0.63	11.3	0.43	0.64
ITEM 15	0.39	0.64	14.1	0.37	0.61	14.4	0.22	0.64
ITEM 16	0.47	0.62	13.3	0.51	0.66	12.9	0.30	0.54
ITEM 17	0.29	0.50	15.2	0.33	0.49	14.8	0.21	0.44
ITEM 18	0.45	0.60	13.6	0.35	0.64	14.6	0.26	0.43
ITEM 19	0.23	0.40	15.9	0.20	0.36	16.4	0.16	0.19
ITEM 20	0.49	0.63	13.1	0.52	0.60	12.8	0.29	0.56
MEAN	0.52	0.58	12.7	0.52	0.57	12.7	0.38	0.51
S.D.	0.20	0.08	2.4	0.21	0.08	2.5	0.19	0.12

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S
FORMULA SCORE	7.6	4.7	7.5	4.6	4.2	3.
# RIGHT	9.8	3.8	9.7	3.7	6.8	3.
# WRONG	8.8	3.8	8.9	3.7	10.7	3
# OMITS	0.1	0.5	0.1	0.5	0.2	0.
# NOT REACHED	0.3	1.4	0.3	1.3	1.3	2.

COEFFICIENT ALPHA	0.76	0.76	0.68
SAMPLE SIZE	8262	8565	1389
POPULATION ESTIMATE	1349255	1387789	215303

MORES

LE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
8.8	0.82	0.52	9.3	0.86	0.56	8.7	0.83	0.56	9.2
11.2	0.67	0.56	11.2	0.65	0.57	11.5	0.64	0.56	11.6
11.5	0.66	0.44	11.4	0.60	0.56	12.0	0.64	0.40	11.6
12.9	0.41	0.57	13.9	0.46	0.62	13.4	0.43	0.49	13.7
14.1	0.37	0.58	14.3	0.36	0.49	14.4	0.34	0.57	14.6
14.5	0.30	0.45	15.1	0.34	0.49	14.6	0.31	0.49	14.9
15.1	0.22	0.44	16.0	0.26	0.56	15.6	0.21	0.51	16.3
17.3	0.13	0.45	17.5	0.15	0.20	17.2	0.13	0.16	17.6
14.7	0.39	0.49	14.2	0.34	0.42	14.6	0.39	0.51	14.2
16.0	0.21	0.33	16.2	0.28	0.33	15.3	0.24	0.39	15.8
12.2	0.67	0.57	11.3	0.55	0.62	12.5	0.66	0.51	11.4
15.0	0.29	0.64	15.2	0.38	0.55	14.3	0.33	0.62	14.8
13.7	0.49	0.56	13.1	0.50	0.57	13.0	0.47	0.59	13.3
16.1	0.20	0.54	16.3	0.23	0.62	16.0	0.20	0.49	16.3
15.1	0.28	0.65	15.3	0.32	0.49	14.8	0.29	0.56	15.2
16.3	0.25	0.37	15.7	0.18	0.37	16.6	0.20	0.42	16.4
15.6	0.22	0.34	16.1	0.27	0.53	15.5	0.24	0.46	15.8
16.9	0.16	0.22	17.0	0.19	0.18	16.5	0.17	0.20	16.8
5.3	0.29	0.58	15.2	0.31	0.54	15.0	0.30	0.55	15.1
4.3	0.37	0.49	14.4	0.38	0.49	14.3	0.37	0.48	14.4
2.1	0.20	0.11	2.2	0.18	0.13	2.0	0.19	0.12	2.1

D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
9	4.0	3.7	4.3	3.9	4.0	3.7
3	6.7	3.1	7.0	3.2	6.8	3.1
7	10.8	3.5	11.1	3.4	11.3	3.3
9	0.2	0.9	0.1	0.6	0.2	0.8
8	1.2	2.6	0.7	2.0	0.6	2.0
	0.64		0.66		0.63	
	1683		2085		2106	
	237491		266929		217268	

D7

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                                   HSB 1980 SOPHOMORES
                                       MATHEMATICS

                              MALE                    FEMALE                   TOTAL
                      ------------------      ------------------      ------------------
                        P+    RBIS  DELTA       P+    RBIS  DELTA       P+    RBIS  DELTA

PART 1 ITEM  1        0.83  0.53    9.1     0.85  0.45    8.8     0.84  0.49    9.0
PART 1 ITEM  2        0.78  0.45    9.9     0.75  0.39   10.4     0.76  0.42   10.1
PART 1 ITEM  3        0.68  0.55   11.2     0.66  0.43   11.4     0.67  0.49   11.3
PART 1 ITEM  4        0.73  0.45   10.6     0.72  0.39   10.7     0.72  0.42   10.6
PART 1 ITEM  5        0.61  0.73   11.8     0.60  0.74   12.0     0.61  0.73   11.9
PART 1 ITEM  6        0.70  0.49   10.9     0.67  0.44   11.3     0.68  0.47   11.1
PART 1 ITEM  7        0.59  0.72   12.1     0.60  0.68   12.0     0.59  0.70   12.1
PART 1 ITEM  8        0.71  0.76   10.8     0.76  0.75   10.2     0.74  0.75   10.5
PART 1 ITEM  9        0.66  0.50   11.3     0.67  0.45   11.3     0.66  0.48   11.3
PART 1 ITEM 10        0.57  0.64   12.3     0.54  0.64   12.6     0.55  0.64   12.5
PART 1 ITEM 11        0.46  0.47   13.4     0.34  0.49   14.7     0.40  0.48   14.0
PART 1 ITEM 12        0.66  0.62   11.4     0.64  0.58   11.5     0.65  0.60   11.5
PART 1 ITEM 13        0.47  0.68   13.3     0.49  0.69   13.1     0.48  0.68   13.2
PART 1 ITEM 14        0.59  0.56   12.1     0.58  0.59   12.2     0.58  0.57   12.2
PART 1 ITEM 15        0.56  0.42   12.4     0.55  0.36   12.5     0.55  0.39   12.5
PART 1 ITEM 16        0.47  0.70   13.3     0.54  0.69   12.6     0.50  0.68   13.0
PART 1 ITEM 17        0.49  0.58   13.1     0.53  0.49   12.7     0.51  0.53   12.9
PART 1 ITEM 18        0.39  0.53   14.2     0.33  0.42   14.8     0.36  0.48   14.5
PART 1 ITEM 19        0.58  0.71   12.2     0.53  0.69   12.7     0.55  0.70   12.5
PART 1 ITEM 20        0.45  0.69   13.5     0.47  0.62   13.3     0.46  0.65   13.4
PART 1 ITEM 21        0.35  0.66   14.6     0.36  0.70   14.5     0.35  0.67   14.5
PART 1 ITEM 22        0.43  0.67   13.7     0.39  0.66   14.1     0.41  0.67   13.9
PART 1 ITEM 23        0.26  0.34   15.5     0.24  0.30   15.8     0.25  0.32   15.7
PART 1 ITEM 24        0.26  0.57   15.6     0.22  0.45   16.0     0.24  0.52   15.8
PART 1 ITEM 25        0.44  0.62   13.6     0.43  0.54   13.7     0.44  0.58   13.6
PART 1 ITEM 26        0.25  0.72   15.7     0.19  0.65   16.6     0.22  0.69   16.1
PART 1 ITEM 27        0.34  0.55   14.7     0.28  0.51   15.3     0.31  0.54   15.0
PART 1 ITEM 28        0.16  0.39   17.1     0.12  0.19   17.7     0.14  0.31   17.3
PART 2 ITEM  1        0.49  0.16   13.1     0.42 -0.02   13.8     0.45  0.08   13.5
PART 2 ITEM  2        0.60  0.73   12.0     0.56  0.71   12.4     0.58  0.72   12.2
PART 2 ITEM  3        0.53  0.45   12.7     0.57  0.42   12.3     0.55  0.43   12.5
PART 2 ITEM  4        0.71  0.48   10.8     0.75  0.38   10.3     0.73  0.43   10.6
PART 2 ITEM  5        0.47  0.82   13.3     0.48  0.79   13.2     0.48  0.80   13.2
PART 2 ITEM  6        0.24  0.55   15.8     0.23  0.43   16.0     0.24  0.49   15.9
PART 2 ITEM  7        0.28  0.47   15.3     0.27  0.46   15.5     0.28  0.47   15.4
PART 2 ITEM  8        0.48  0.55   13.2     0.47  0.57   13.3     0.47  0.56   13.3
PART 2 ITEM  9        0.26  0.31   15.6     0.21  0.24   16.2     0.24  0.28   15.9
PART 2 ITEM 10        0.33  0.35   14.8     0.30  0.28   15.1     0.31  0.32   14.9

   MEAN               0.50  0.56   13.1     0.48  0.51   13.2     0.49  0.53   13.1
   S.D.               0.17  0.14    1.8     0.18  0.17    2.0     0.17  0.15    1.9

SUMMARY:
                         MEAN     S.D.          MEAN     S.D.          MEAN     S.D.
FORMULA SCORE            12.6    10.2           11.9     9.2           12.2     9.7
# RIGHT                  18.7     7.8           18.2     7.0           18.5     7.4
# WRONG                  18.4     7.7           19.0     7.0           18.7     7.3
# OMITS                   0.4     1.4            0.4     1.4            0.4     1.4
# NOT REACHED P1          0.2     1.6            0.2     1.2            0.2     1.4
# NOT REACHED P2          0.2     1.1            0.2     1.0            0.2     1.1

COEFFICIENT ALPHA           0.88                  0.85                  0.87
SAMPLE SIZE                12083                 12699                 24782
POPULATION ESTIMATE      1874180               1883390               3757569
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D8

HSB 1980 SOPHOMORES
MATHEMATICS

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.87	0.50	8.6	0.78	0.43	9.9	0.77	0.40	10.0	0.84	0.49	9.0
PART 1 ITEM 2	0.79	0.42	9.8	0.69	0.39	11.0	0.69	0.36	11.0	0.76	0.42	10.1
PART 1 ITEM 3	0.71	0.50	10.8	0.55	0.37	12.5	0.56	0.39	12.4	0.67	0.49	11.3
PART 1 ITEM 4	0.76	0.40	10.1	0.60	0.33	12.0	0.61	0.36	11.9	0.72	0.42	10.6
PART 1 ITEM 5	0.68	0.72	11.2	0.37	0.67	14.3	0.43	0.63	13.7	0.61	0.73	11.9
PART 1 ITEM 6	0.72	0.49	10.7	0.57	0.28	12.3	0.60	0.32	12.0	0.68	0.47	11.1
PART 1 ITEM 7	0.66	0.70	11.4	0.41	0.58	13.9	0.42	0.59	13.8	0.59	0.70	12.1
PART 1 ITEM 8	0.80	0.75	9.6	0.53	0.67	12.7	0.56	0.69	12.4	0.74	0.75	10.5
PART 1 ITEM 9	0.71	0.46	10.8	0.53	0.41	12.7	0.54	0.41	12.6	0.66	0.48	11.3
PART 1 ITEM 10	0.61	0.63	11.9	0.35	0.53	14.5	0.43	0.58	13.8	0.55	0.64	12.5
PART 1 ITEM 11	0.44	0.46	13.6	0.24	0.40	15.8	0.33	0.41	14.8	0.40	0.48	14.0
PART 1 ITEM 12	0.69	0.60	11.0	0.51	0.51	12.9	0.54	0.53	12.6	0.65	0.60	11.5
PART 1 ITEM 13	0.54	0.65	12.6	0.29	0.70	15.2	0.33	0.64	14.8	0.48	0.68	13.2
PART 1 ITEM 14	0.65	0.52	11.4	0.36	0.57	14.4	0.42	0.56	13.8	0.58	0.57	12.2
PART 1 ITEM 15	0.58	0.40	12.2	0.46	0.30	13.4	0.48	0.30	13.2	0.55	0.39	12.5
PART 1 ITEM 16	0.55	0.69	12.5	0.35	0.61	14.6	0.36	0.59	14.4	0.50	0.68	13.0
PART 1 ITEM 17	0.54	0.55	12.6	0.43	0.43	13.7	0.42	0.44	13.8	0.51	0.53	12.9
PART 1 ITEM 18	0.39	0.47	14.1	0.26	0.41	15.6	0.27	0.43	15.5	0.36	0.48	14.5
PART 1 ITEM 19	0.61	0.69	11.8	0.33	0.60	14.8	0.41	0.62	14.0	0.55	0.70	12.5
PART 1 ITEM 20	0.52	0.64	12.8	0.28	0.55	15.3	0.30	0.56	15.2	0.46	0.65	13.4
PART 1 ITEM 21	0.40	0.66	14.0	0.19	0.52	16.5	0.23	0.60	15.9	0.35	0.67	14.5
PART 1 ITEM 22	0.46	0.66	13.4	0.21	0.49	16.2	0.28	0.53	15.3	0.41	0.67	13.9
PART 1 ITEM 23	0.27	0.31	15.4	0.18	0.26	16.6	0.22	0.27	16.2	0.25	0.32	15.7
PART 1 ITEM 24	0.27	0.51	15.4	0.15	0.45	17.1	0.16	0.43	17.0	0.24	0.52	15.8
PART 1 ITEM 25	0.48	0.58	13.2	0.29	0.41	15.2	0.30	0.46	15.1	0.44	0.58	13.6
PART 1 ITEM 26	0.26	0.68	15.6	0.09	0.44	18.3	0.11	0.59	17.8	0.22	0.69	16.1
PART 1 ITEM 27	0.35	0.53	14.6	0.16	0.36	16.9	0.22	0.38	16.1	0.31	0.54	15.0
PART 1 ITEM 28	0.14	0.41	17.4	0.16	-0.03	17.0	0.13	0.08	17.6	0.14	0.31	17.3
PART 2 ITEM 1	0.43	0.18	13.7	0.52	-0.17	12.8	0.48	-0.11	13.2	0.45	0.08	13.5
PART 2 ITEM 2	0.64	0.70	11.5	0.38	0.65	14.2	0.41	0.66	13.9	0.58	0.72	12.2
PART 2 ITEM 3	0.57	0.48	12.3	0.48	0.23	13.2	0.50	0.29	13.0	0.55	0.43	12.5
PART 2 ITEM 4	0.75	0.44	10.3	0.66	0.33	11.3	0.65	0.41	11.5	0.73	0.43	10.6
PART 2 ITEM 5	0.55	0.78	12.5	0.23	0.76	15.9	0.29	0.73	15.3	0.48	0.80	13.2
PART 2 ITEM 6	0.26	0.49	15.6	0.16	0.38	17.0	0.17	0.35	16.9	0.24	0.49	15.9
PART 2 ITEM 7	0.31	0.45	15.0	0.17	0.38	16.9	0.19	0.39	16.6	0.28	0.47	15.4
PART 2 ITEM 8	0.52	0.56	12.8	0.30	0.43	15.1	0.38	0.43	14.2	0.47	0.56	13.3
PART 2 ITEM 9	0.24	0.30	15.8	0.19	0.15	16.4	0.22	0.15	16.1	0.24	0.28	15.9
PART 2 ITEM 10	0.33	0.31	14.7	0.25	0.27	15.8	0.26	0.26	15.6	0.31	0.32	14.9
MEAN	0.53	0.53	12.7	0.36	0.42	14.6	0.39	0.44	14.3	0.49	0.53	13.1
S.D.	0.18	0.14	2.0	0.17	0.19	1.9	0.16	0.17	1.8	0.17	0.15	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	14.2	9.6	5.9	7.2	7.0	7.8	12.2	9.7
# RIGHT	20.0	7.3	13.6	5.5	14.5	5.9	18.5	7.6
# WRONG	17.3	7.2	23.1	5.9	22.5	6.1	18.7	7.3
# OMITS	0.4	1.4	0.6	1.5	0.5	1.4	0.4	1.4
# NOT REACHED P1	0.1	1.2	0.5	2.1	0.2	1.6	0.2	1.4
# NOT REACHED P2	0.1	1.0	0.3	1.4	0.2	1.3	0.2	1.1
COEFFICIENT ALPHA	0.87		0.76		0.79		0.87	
SAMPLE SIZE	16798		3068		4206		24782	
POPULATION ESTIMATE	2730930		451289		684281		3757569	

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                                          HSB 1980 SOPHOMORES
                                              MATHEMATICS

                        WHITE MALE          WHITE FEMALE          BLACK MALE           BLACK FEMALE         HISPANIC MALE        HISPANIC FEMALE
                   ------------------   ------------------   ------------------   ------------------   ------------------   ------------------
                    P+    RBIS  DELTA    P+    RBIS  DELTA    P+    RBIS  DELTA    P+    RBIS  DELTA    P+    RBIS  DELTA    P+    RBIS  DELTA
PART 1 ITEM  1     0.86  0.56    8.7    0.87  0.45    8.4    0.78  0.45    9.9    0.78  0.42    9.9    0.77  0.63   10.1    0.78  0.36    9.9
PART 1 ITEM  2     0.81  0.46    9.6    0.77  0.38   10.1    0.71  0.41   10.8    0.67  0.37   11.2    0.70  0.34   10.9    0.68  0.39   11.2
PART 1 ITEM  3     0.73  0.54   10.6    0.69  0.46   11.1    0.53  0.45   12.7    0.58  0.29   12.2    0.55  0.48   12.5    0.57  0.28   12.3
PART 1 ITEM  4     0.77  0.43   10.0    0.75  0.36   10.3    0.60  0.34   12.0    0.60  0.32   12.0    0.61  0.36   11.9    0.61  0.37   11.9
PART 1 ITEM  5     0.68  0.73   11.1    0.67  0.72   11.2    0.39  0.67   14.2    0.36  0.67   14.4    0.46  0.61   13.4    0.40  0.66   14.0
PART 1 ITEM  6     0.74  0.51   10.5    0.70  0.47   10.9    0.58  0.33   12.2    0.55  0.24   12.5    0.60  0.34   12.0    0.59  0.29   12.1
PART 1 ITEM  7     0.66  0.73   11.4    0.66  0.67   11.4    0.39  0.60   14.1    0.42  0.57   13.8    0.43  0.59   13.7    0.42  0.59   13.8
PART 1 ITEM  8     0.78  0.75    9.9    0.82  0.75    9.3    0.49  0.70   13.1    0.56  0.64   12.4    0.55  0.69   12.5    0.57  0.71   12.3
PART 1 ITEM  9     0.71  0.48   10.8    0.71  0.43   10.7    0.54  0.48   12.6    0.51  0.36   12.9    0.55  0.45   12.5    0.53  0.36   12.7
PART 1 ITEM 10     0.63  0.64   11.7    0.59  0.63   12.1    0.38  0.56   14.2    0.33  0.50   14.7    0.45  0.56   13.5    0.40  0.60   14.1
PART 1 ITEM 11     0.51  0.44   12.9    0.37  0.48   14.3    0.27  0.36   15.4    0.22  0.44   16.1    0.38  0.41   14.2    0.26  0.40   15.6
PART 1 ITEM 12     0.70  0.62   10.9    0.68  0.58   11.1    0.49  0.50   13.1    0.53  0.52   12.7    0.55  0.54   12.5    0.52  0.52   12.8
PART 1 ITEM 13     0.53  0.66   12.7    0.55  0.65   12.5    0.27  0.69   15.4    0.31  0.71   15.0    0.33  0.59   14.7    0.33  0.70   14.8
PART 1 ITEM 14     0.66  0.51   11.4    0.64  0.53   11.5    0.38  0.55   14.3    0.35  0.60   14.6    0.44  0.56   13.6    0.38  0.56   14.2
PART 1 ITEM 15     0.59  0.43   12.1    0.57  0.36   12.3    0.44  0.29   13.6    0.47  0.31   13.3    0.49  0.30   13.1    0.47  0.30   13.3
PART 1 ITEM 16     0.51  0.71   12.9    0.59  0.68   12.1    0.31  0.60   15.0    0.38  0.63   14.2    0.35  0.56   14.6    0.37  0.62   14.3
PART 1 ITEM 17     0.52  0.60   12.8    0.56  0.51   12.4    0.38  0.48   14.2    0.47  0.38   13.3    0.42  0.45   13.8    0.43  0.43   13.7
PART 1 ITEM 18     0.43  0.52   13.7    0.36  0.41   14.5    0.28  0.46   15.3    0.24  0.35   15.8    0.28  0.45   15.3    0.26  0.40   15.6
PART 1 ITEM 19     0.64  0.70   11.6    0.59  0.68   12.1    0.34  0.61   14.6    0.31  0.59   15.0    0.44  0.63   13.6    0.36  0.62   14.4
PART 1 ITEM 20     0.51  0.67   12.9    0.52  0.60   12.8    0.28  0.56   15.4    0.29  0.54   15.2    0.27  0.61   15.4    0.32  0.51   14.8
PART 1 ITEM 21     0.39  0.65   14.1    0.41  0.69   13.9    0.19  0.54   16.5    0.19  0.51   16.6    0.24  0.58   15.8    0.22  0.62   16.1
PART 1 ITEM 22     0.48  0.67   13.2    0.44  0.65   13.6    0.22  0.50   16.1    0.21  0.49   16.2    0.32  0.53   14.9    0.24  0.53   15.8
PART 1 ITEM 23     0.29  0.33   15.3    0.26  0.29   15.6    0.19  0.25   16.5    0.18  0.27   16.7    0.22  0.30   16.0    0.21  0.23   16.3
PART 1 ITEM 24     0.29  0.57   15.2    0.25  0.44   15.7    0.16  0.44   17.0    0.15  0.46   17.2    0.17  0.51   16.7    0.14  0.29   17.2
PART 1 ITEM 25     0.49  0.63   13.1    0.48  0.54   13.2    0.30  0.44   15.1    0.28  0.39   15.3    0.29  0.50   15.2    0.31  0.41   15.0
PART 1 ITEM 26     0.30  0.71   15.1    0.22  0.65   16.1    0.10  0.47   18.0    0.08  0.39   18.5    0.13  0.63   17.4    0.09  0.52   18.4
PART 1 ITEM 27     0.38  0.55   14.2    0.32  0.51   14.9    0.18  0.39   16.7    0.15  0.33   17.1    0.24  0.39   15.9    0.19  0.36   16.4
PART 1 ITEM 28     0.16  0.48   17.0    0.11  0.30   17.8    0.15 -0.02   17.2    0.16 -0.04   16.9    0.13  0.15   17.6    0.13 -0.01   17.6
PART 2 ITEM  1     0.48  0.26   13.2    0.39  0.08   14.1    0.53 -0.14   12.7    0.50 -0.21   13.0    0.48 -0.08   13.2    0.47 -0.16   13.3
PART 2 ITEM  2     0.66  0.72   11.3    0.63  0.69   11.7    0.40  0.66   14.0    0.36  0.65   14.4    0.44  0.68   13.6    0.38  0.63   14.3
PART 2 ITEM  3     0.55  0.50   12.5    0.59  0.48   12.1    0.45  0.24   13.5    0.50  0.22   13.0    0.49  0.32   13.1    0.52  0.26   12.8
PART 2 ITEM  4     0.74  0.48   10.5    0.77  0.39   10.0    0.63  0.41   11.7    0.69  0.26   11.0    0.62  0.47   11.8    0.68  0.32   11.2
PART 2 ITEM  5     0.54  0.80   12.6    0.56  0.76   12.4    0.23  0.78   15.9    0.24  0.74   15.9    0.29  0.73   15.2    0.28  0.77   15.3
PART 2 ITEM  6     0.27  0.56   15.4    0.25  0.42   15.7    0.16  0.39   17.0    0.16  0.37   17.0    0.17  0.38   16.9    0.16  0.31   16.9
PART 2 ITEM  7     0.31  0.46   15.0    0.30  0.43   15.0    0.19  0.38   16.5    0.15  0.39   17.2    0.19  0.40   16.5    0.17  0.39   16.7
PART 2 ITEM  8     0.52  0.57   12.8    0.52  0.56   12.8    0.33  0.37   14.8    0.28  0.50   15.3    0.39  0.41   14.1    0.36  0.46   14.4
PART 2 ITEM  9     0.27  0.33   15.4    0.22  0.26   16.1    0.19  0.18   16.5    0.20  0.13   16.4    0.23  0.13   15.9    0.20  0.16   16.4
PART 2 ITEM 10     0.36  0.33   14.5    0.31  0.28   15.0    0.23  0.30   15.9    0.26  0.24   15.6    0.26  0.29   15.6    0.26  0.22   15.6

   MEAN            0.54  0.56   12.6    0.52  0.51   12.8    0.36  0.44   14.6    0.36  0.41   14.6    0.39  0.45   14.2    0.39  0.42   14.4
   S.D.            0.17  0.13    1.9    0.19  0.16    2.1    0.17  0.18    1.9    0.18  0.19    2.0    0.16  0.16    1.8    0.17  0.19    1.9

SUMMARY:
                        MEAN    S.D.        MEAN    S.D.        MEAN    S.D.        MEAN    S.D.        MEAN    S.D.        MEAN    S.D.
FORMULA SCORE           14.7    10.1        13.7     9.0         5.9     7.5         5.9     6.9         7.4     8.1         6.5     7.3
# RIGHT                 20.4     7.7        19.6     6.9        13.5     5.7        13.6     5.3        14.8     6.2        14.2     5.6
# WRONG                 16.9     7.5        17.7     6.8        23.0     6.1        23.1     5.7        22.3     6.3        22.9     5.8
# OMITS                  0.4     1.4         0.4     1.4         0.6     1.6         0.6     1.4         0.4     1.2         0.5     1.5
# NOT REACHED P1         0.2     1.4         0.1     1.0         0.5     2.2         0.4     2.0         0.2     1.6         0.2     1.6
# NOT REACHED P2         0.2     1.1         0.1     0.9         0.3     1.3         0.3     1.4         0.2     1.3         0.2     1.4

COEFFICIENT ALPHA           0.88               0.85                0.78                0.74                0.80                0.76
SAMPLE SIZE                 8248               8550                1386                1686                2099                2116
POPULATION ESTIMATE      1364711            1386220              213521              237769              267066         [illegible]
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D10

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                              HSB 1980 SOPHOMORES
                                    SCIENCE

                      MALE                    FEMALE                   TOTAL
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               P+    RBIS   DELTA     P+    RBIS   DELTA     P+    RBIS   DELTA

ITEM  1       0.83   0.67    9.2     0.82   0.60    9.3     0.82   0.63    9.3
ITEM  2       0.74   0.47   10.4     0.73   0.51   10.5     0.74   0.49   10.4
ITEM  3       0.68   0.72   11.1     0.71   0.60   10.8     0.70   0.65   10.9
ITEM  4       0.78   0.63   10.0     0.67   0.55   11.2     0.73   0.60   10.6
ITEM  5       0.81   0.79    9.6     0.73   0.73   10.5     0.77   0.76   10.1
ITEM  6       0.85   0.58    8.9     0.83   0.52    9.1     0.84   0.55    9.0
ITEM  7       0.53   0.52   12.7     0.53   0.54   12.7     0.53   0.53   12.7
ITEM  8       0.80   0.77    9.7     0.72   0.60   10.6     0.76   0.68   10.2
ITEM  9       0.67   0.72   11.2     0.53   0.70   12.7     0.60   0.72   12.0
ITEM 10       0.72   0.40   10.7     0.66   0.42   11.4     0.69   0.41   11.0
ITEM 11       0.63   0.59   11.7     0.45   0.51   13.5     0.54   0.56   12.6
ITEM 12       0.49   0.64   13.1     0.46   0.59   13.4     0.47   0.61   13.3
ITEM 13       0.53   0.70   12.7     0.54   0.64   12.6     0.53   0.66   12.7
ITEM 14       0.25   0.41   15.7     0.21   0.40   16.3     0.23   0.41   16.0
ITEM 15       0.50   0.40   13.0     0.39   0.24   14.1     0.45   0.34   13.5
ITEM 16       0.35   0.53   14.5     0.39   0.45   14.1     0.37   0.48   14.3
ITEM 17       0.48   0.66   13.2     0.44   0.61   13.6     0.46   0.63   13.4
ITEM 18       0.34   0.36   14.7     0.30   0.40   15.1     0.32   0.38   14.9
ITEM 19       0.29   0.48   15.2     0.24   0.36   15.8     0.27   0.43   15.5
ITEM 20       0.21   0.22   16.2     0.23   0.18   16.0     0.22   0.19   16.1

   MEAN       0.57   0.56   12.2     0.53   0.51   12.7     0.55   0.54   12.4
   S.D.       0.20   0.15    2.2     0.19   0.14    2.1     0.20   0.14    2.1

SUMMARY:

                  MEAN    S.D.          MEAN    S.D.          MEAN    S.D.
FORMULA SCORE      9.3     4.7           8.3     4.4           8.8     4.6
# RIGHT           11.3     3.8          10.5     3.6          10.9     3.7
# WRONG            8.0     3.8           8.9     3.6           8.5     3.7
# OMITS            0.2     0.8           0.2     0.9           0.2     0.8
# NOT REACHED      0.4     1.5           0.4     1.3           0.4     1.4

COEFFICIENT ALPHA       0.76                 0.71                 0.74
SAMPLE SIZE            11979                12568                24547
POPULATION ESTIMATE  1859999              1862709              3722708
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D11

HSB 1980 SOPHOMORES
SCIENCE

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.87	0.58	8.6	0.71	0.61	10.7	0.71	0.59	10.8	0.82	0.63	9.3
ITEM 2	0.78	0.42	9.9	0.58	0.50	12.2	0.64	0.49	11.6	0.74	0.49	10.4
ITEM 3	0.75	0.62	10.3	0.54	0.60	12.6	0.53	0.62	12.7	0.70	0.65	10.9
ITEM 4	0.77	0.59	10.1	0.58	0.53	12.2	0.62	0.52	11.7	0.73	0.60	10.6
ITEM 5	0.85	0.72	8.9	0.47	0.62	13.3	0.60	0.69	12.0	0.77	0.76	10.1
ITEM 6	0.88	0.49	8.4	0.73	0.52	10.5	0.74	0.50	10.4	0.84	0.55	9.0
ITEM 7	0.58	0.49	12.2	0.30	0.46	15.1	0.41	0.45	13.9	0.53	0.53	12.7
ITEM 8	0.81	0.67	9.5	0.59	0.57	12.1	0.62	0.62	11.8	0.76	0.68	10.2
ITEM 9	0.69	0.67	11.0	0.25	0.63	15.6	0.42	0.65	13.8	0.60	0.72	12.0
ITEM 10	0.72	0.37	10.7	0.56	0.43	12.4	0.63	0.46	11.7	0.69	0.41	11.0
ITEM 11	0.59	0.54	12.1	0.35	0.48	14.6	0.43	0.51	13.7	0.54	0.56	17.6
ITEM 12	0.52	0.62	12.8	0.34	0.47	14.7	0.34	0.51	14.7	0.47	0.61	13.3
ITEM 13	0.60	0.65	12.0	0.34	0.61	14.6	0.36	0.57	14.4	0.53	0.66	12.7
ITEM 14	0.25	0.42	15.7	0.17	0.35	16.9	0.17	0.35	16.8	0.23	0.41	16.0
ITEM 15	0.46	0.38	13.4	0.42	0.23	13.8	0.43	0.30	13.7	0.45	0.34	13.5
ITEM 16	0.41	0.46	13.9	0.26	0.44	15.6	0.26	0.45	15.5	0.37	0.48	14.3
ITEM 17	0.51	0.61	12.9	0.27	0.57	15.4	0.31	0.61	15.0	0.46	0.63	13.4
ITEM 18	0.34	0.41	14.7	0.25	0.29	15.7	0.28	0.27	15.3	0.32	0.38	14.9
ITEM 19	0.29	0.47	15.2	0.19	0.24	16.5	0.21	0.27	16.3	0.27	0.43	15.5
ITEM 20	0.22	0.23	16.1	0.23	0.11	15.9	0.22	0.22	16.1	0.22	0.19	16.1
MEAN	0.59	0.52	11.9	0.41	0.46	14.0	0.45	0.48	13.6	0.55	0.54	12.4
S.D.	0.21	0.12	2.4	0.17	0.14	1.9	0.17	0.14	1.9	0.20	0.14	2.1

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	9.9	4.2	5.2	4.0	6.2	4.3	8.8	4.6
# RIGHT	11.8	3.4	7.9	3.3	8.8	3.5	10.9	3.7
# WRONG	7.7	3.4	10.8	3.7	10.4	3.6	8.5	3.7
# OMITS	0.2	0.8	0.3	0.9	0.2	0.9	0.2	0.8
# NOT REACHED	0.3	1.1	1.1	2.3	0.5	1.7	0.4	1.4
COEFFICIENT ALPHA	0.69		0.64		0.68		0.74	
SAMPLE SIZE	16692		2994		4157		24547	
POPULATION ESTIMATE	2710220		443451		478771		3722708	

HSB 1980 SO
SCIEN

	WHITE MALE			WHITE FEMALE			BLACK	
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBI
ITEM 1	0.87	0.63	8.5	0.86	0.55	8.6	0.72	0.6
ITEM 2	0.78	0.41	9.9	0.79	0.44	9.8	0.63	0.4
ITEM 3	0.75	0.70	10.3	0.76	0.55	10.2	0.52	0.6
ITEM 4	0.81	0.64	9.4	0.72	0.54	10.7	0.65	0.5
ITEM 5	0.88	0.75	8.2	0.82	0.68	9.4	0.52	0.6
ITEM 6	0.88	0.54	8.3	0.87	0.46	8.4	0.77	0.5
ITEM 7	0.58	0.49	12.2	0.59	0.50	12.1	0.33	0.4
ITEM 8	0.85	0.77	8.8	0.77	0.58	10.0	0.63	0.6
ITEM 9	0.76	0.68	10.1	0.62	0.65	11.8	0.32	0.6
ITEM 10	0.75	0.35	10.3	0.69	0.37	11.0	0.60	0.4
ITEM 11	0.69	0.54	11.0	0.49	0.51	13.1	0.41	0.5
ITEM 12	0.54	0.64	12.6	0.50	0.60	13.0	0.34	0.5
ITEM 13	0.59	0.69	12.1	0.60	0.62	12.0	0.34	0.6
ITEM 14	0.27	0.41	15.4	0.22	0.42	16.0	0.18	0.3
ITEM 15	0.52	0.44	12.8	0.39	0.29	14.1	0.45	0.2
ITEM 16	0.39	0.52	14.1	0.43	0.43	13.7	0.25	0.5
ITEM 17	0.54	0.63	12.6	0.48	0.58	13.2	0.27	0.6
ITEM 18	0.35	0.39	14.5	0.32	0.43	14.8	0.29	0.3
ITEM 19	0.32	0.52	14.8	0.25	0.39	15.6	0.20	0.2
ITEM 20	0.22	0.24	16.2	0.23	0.22	16.0	0.21	0.1
MEAN	0.62	0.55	11.6	0.57	0.49	12.2	0.43	0.4
S.D.	0.21	0.14	2.4	0.21	0.12	2.3	0.18	0.1

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN
FORMULA SCORE	10.4	4.3	9.3	4.1	5.8
# RIGHT	12.2	3.5	11.3	3.3	9.3
# WRONG	7.3	3.5	8.2	3.3	10.2
# OMITS	0.2	0.7	0.2	0.9	0.3
# NOT REACHED	0.3	1.2	0.3	1.0	1.1

COEFFICIENT ALPHA	0.72	0.66	0.6
SAMPLE SIZE	8201	8491	135
POPULATION ESTIMATE	1336555	1373665	21070

PHOMORES
CE

	MALE			BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE	
S	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
5	10.6	0.70	0.57	10.9	0.72	0.61	10.7	0.69	0.57	11.0
9	11.7	0.54	0.50	12.6	0.65	0.50	11.5	0.62	0.49	11.7
5	12.8	0.56	0.58	12.4	0.51	0.66	12.9	0.56	0.61	12.4
4	11.5	0.52	0.51	12.8	0.68	0.56	11.1	0.55	0.46	12.5
4	12.8	0.42	0.59	13.8	0.65	0.72	11.4	0.53	0.64	12.7
4	10.0	0.70	0.49	10.9	0.75	0.55	10.3	0.72	0.44	10.6
7	14.8	0.28	0.49	15.4	0.43	0.45	13.7	0.40	0.45	14.1
4	11.6	0.56	0.49	12.4	0.65	0.70	11.5	0.58	0.51	12.2
5	14.9	0.20	0.57	16.4	0.50	0.64	13.0	0.32	0.64	14.9
1	12.0	0.53	0.44	12.7	0.67	0.45	11.2	0.57	0.46	12.3
5	13.9	0.28	0.36	15.3	0.50	0.56	13.0	0.35	0.40	14.6
0	14.6	0.33	0.45	14.8	0.35	0.53	14.6	0.33	0.49	14.8
3	14.5	0.34	0.60	14.6	0.35	0.61	14.6	0.37	0.55	14.3
2	16.6	0.15	0.37	17.1	0.18	0.38	16.6	0.16	0.30	17.0
9	13.5	0.39	0.14	14.1	0.45	0.34	13.6	0.41	0.23	14.0
1	15.8	0.27	0.39	15.5	0.24	0.49	15.8	0.29	0.44	15.2
3	15.4	0.27	0.53	15.5	0.32	0.62	14.8	0.29	0.60	15.3
1	15.3	0.22	0.25	16.1	0.31	0.24	15.0	0.25	0.30	15.7
6	16.4	0.19	0.23	16.5	0.21	0.28	16.3	0.21	0.25	16.2
6	16.2	0.25	0.10	15.8	0.20	0.23	16.4	0.25	0.23	15.8
9	13.7	0.38	0.43	14.3	0.47	0.51	13.4	0.42	0.45	13.9
6	1.9	0.17	0.15	1.8	0.19	0.14	2.0	0.16	0.13	1.8

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
S.D.						
4.2	4.6	3.7	6.7	4.5	5.6	4.0
3.5	7.4	3.0	9.2	3.6	8.3	3.3
3.8	11.3	3.5	10.1	3.7	10.9	3.4
0.9	0.3	1.0	0.2	1.0	0.3	0.9
2.3	1.0	2.2	0.5	1.7	0.6	1.7

8	0.58	0.71	0.63
4	1640	2067	2090
0	232750	264213	214559

D12

D13

HSB 1980 SOPHOMORES
WRITING

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.63	0.67	11.7	0.77	0.68	10.0	0.70	0.69	10.9
ITEM 2	0.45	0.64	13.5	0.60	0.67	11.9	0.53	0.67	12.7
ITEM 3	0.61	0.69	11.9	0.80	0.71	9.7	0.70	0.72	10.9
ITEM 4	0.52	0.63	12.8	0.63	0.66	11.7	0.58	0.65	12.2
ITEM 5	0.31	0.47	14.9	0.40	0.56	14.0	0.36	0.52	14.4
ITEM 6	0.68	0.56	11.1	0.77	0.55	10.1	0.72	0.57	10.6
ITEM 7	0.60	0.57	12.0	0.68	0.59	11.1	0.64	0.59	11.6
ITEM 8	0.58	0.44	12.2	0.65	0.40	11.5	0.62	0.43	11.8
ITEM 9	0.78	0.53	9.9	0.84	0.50	9.1	0.81	0.52	9.5
ITEM 10	0.45	0.62	13.5	0.58	0.62	12.1	0.52	0.63	12.8
ITEM 11	0.67	0.75	11.3	0.78	0.76	9.9	0.72	0.76	10.6
ITEM 12	0.33	0.54	14.8	0.43	0.53	13.7	0.38	0.54	14.2
ITEM 13	0.42	0.63	13.8	0.51	0.64	12.9	0.47	0.64	13.3
ITEM 14	0.62	0.73	11.8	0.75	0.74	10.3	0.69	0.75	11.0
ITEM 15	0.54	0.65	12.6	0.68	0.69	11.1	0.61	0.68	11.9
ITEM 16	0.65	0.68	11.4	0.76	0.68	10.1	0.71	0.69	10.8
ITEM 17	0.67	0.64	11.2	0.77	0.65	10.0	0.72	0.66	10.6
MEAN	0.56	0.61	12.4	0.67	0.62	11.1	0.62	0.63	11.8
S.D.	0.13	0.08	1.3	0.13	0.09	1.4	0.13	0.09	1.3

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	6.9	5.1	9.4	4.8	8.1	5.1
# RIGHT	9.2	4.0	11.1	3.7	10.2	4.0
# WRONG	7.0	3.9	5.3	3.4	6.2	3.8
# OMITS	0.2	0.7	0.2	0.7	0.2	0.7
# NOT REACHED	0.5	1.6	0.4	1.3	0.4	1.4
COEFFICIENT ALPHA	0.79		0.78		0.80	
SAMPLE SIZE	11876		12443		24319	
POPULATION ESTIMATE	1840844		1842131		3682975	

D14

HSB 1980 SOPHOMORES
WRITING

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.75	0.67	10.3	0.55	0.66	12.5	0.56	0.66	12.4	0.70	0.69	10.9
ITEM 2	0.58	0.66	12.2	0.36	0.62	14.4	0.38	0.60	14.2	0.53	0.67	12.7
ITEM 3	0.75	0.73	10.3	0.59	0.64	12.1	0.57	0.65	12.3	0.70	0.72	10.9
ITEM 4	0.62	0.66	11.8	0.43	0.58	13.7	0.44	0.53	13.6	0.58	0.65	12.2
ITEM 5	0.39	0.53	14.1	0.26	0.42	15.6	0.27	0.44	15.5	0.36	0.52	14.4
ITEM 6	0.76	0.57	10.2	0.63	0.47	11.7	0.60	0.49	11.9	0.72	0.57	10.6
ITEM 7	0.68	0.60	11.1	0.52	0.50	12.8	0.52	0.47	12.8	0.64	0.59	11.6
ITEM 8	0.65	0.41	11.5	0.51	0.34	12.9	0.53	0.43	12.7	0.62	0.43	11.8
ITEM 9	0.84	0.50	9.0	0.73	0.47	10.6	0.72	0.50	10.7	0.81	0.52	9.5
ITEM 10	0.57	0.62	12.3	0.37	0.56	14.4	0.37	0.56	14.3	0.52	0.63	12.8
ITEM 11	0.78	0.76	9.9	0.56	0.66	12.4	0.56	0.68	12.4	0.72	0.76	10.6
ITEM 12	0.41	0.55	14.0	0.30	0.50	15.0	0.27	0.47	15.4	0.38	0.54	14.2
ITEM 13	0.52	0.64	12.8	0.30	0.49	15.1	0.31	0.52	15.0	0.47	0.64	13.3
ITEM 14	0.75	0.74	10.4	0.49	0.69	13.1	0.52	0.67	12.8	0.69	0.75	11.0
ITEM 15	0.66	0.68	11.3	0.42	0.54	13.8	0.45	0.58	13.5	0.61	0.68	11.9
ITEM 16	0.76	0.69	10.2	0.54	0.56	12.6	0.56	0.63	12.4	0.71	0.69	10.8
ITEM 17	0.77	0.66	10.1	0.57	0.55	12.3	0.59	0.57	12.1	0.72	0.66	10.6
MEAN	0.66	0.63	11.3	0.48	0.54	13.2	0.48	0.56	13.2	0.62	0.63	11.8
S.D.	0.13	0.09	1.4	0.13	0.09	1.3	0.12	0.08	1.3	0.13	0.09	1.3

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	9.2	4.9	4.9	4.5	5.2	4.7	8.1	5.1
# RIGHT	11.0	3.7	7.6	3.5	8.0	3.6	10.2	4.0
# WRONG	5.5	3.6	8.0	3.5	8.3	3.6	6.2	3.8
# OMITS	0.2	0.7	0.3	0.9	0.3	0.8	0.2	0.7
# NOT REACHED	0.3	1.2	1.1	2.2	0.5	1.6	0.4	1.4

	WHITE	BLACK	HISPANIC	TOTAL
COEFFICIENT ALPHA	0.79	0.71	0.73	0.80
SAMPLE SIZE	16579	2937	4113	24319
POPULATION ESTIMATE	2688890	434026	472148	3682975

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                                                    HSB 1980 SOPHOMORES
                                                          WRITING

                     WHITE MALE            WHITE FEMALE           BLACK MALE            BLACK FEMALE          HISPANIC MALE         HISPANIC FEMALE
                  -----------------     -----------------     -----------------     -----------------     -----------------     -----------------
                  P+    RBIS   DELTA    P+    RBIS   DELTA    P+    RBIS   DELTA    P+    RBIS   DELTA    P+    RBIS   DELTA    P+    RBIS   DELTA
ITEM  1           0.68  0.66   11.1     0.82  0.62    9.3     0.48  0.65   13.2     0.61  0.64   11.9     0.51  0.62   12.9     0.63  0.69   11.7
ITEM  2           0.49  0.64   13.1     0.66  0.63   11.3     0.32  0.57   14.9     0.40  0.65   14.0     0.33  0.57   14.8     0.45  0.61   13.5
ITEM  3           0.65  0.70   11.5     0.84  0.66    9.0     0.52  0.61   12.8     0.65  0.65   11.4     0.49  0.61   13.1     0.66  0.66   11.4
ITEM  4           0.57  0.64   12.3     0.68  0.65   11.2     0.40  0.54   14.0     0.46  0.60   13.4     0.40  0.51   14.0     0.49  0.52   13.1
ITEM  5           0.34  0.48   14.7     0.44  0.56   13.6     0.23  0.41   15.9     0.28  0.42   15.4     0.25  0.40   15.7     0.29  0.48   15.3
ITEM  6           0.72  0.56   10.7     0.80  0.55    9.6     0.58  0.47   12.2     0.68  0.44   11.2     0.58  0.47   12.2     0.64  0.50   11.6
ITEM  7           0.64  0.59   11.6     0.73  0.59   10.6     0.49  0.47   13.1     0.54  0.51   12.6     0.49  0.45   13.1     0.55  0.48   12.5
ITEM  8           0.61  0.43   11.9     0.69  0.37   11.1     0.49  0.39   13.1     0.53  0.29   12.7     0.51  0.43   12.9     0.56  0.42   12.4
ITEM  9           0.81  0.53    9.4     0.86  0.43    8.6     0.70  0.44   10.9     0.75  0.50   10.3     0.70  0.47   10.9     0.74  0.53   10.4
ITEM 10           0.50  0.61   13.0     0.63  0.60   11.6     0.31  0.56   15.0     0.42  0.53   13.8     0.31  0.56   15.0     0.44  0.53   13.6
ITEM 11           0.72  0.75   10.7     0.84  0.74    9.1     0.50  0.66   13.0     0.62  0.65   11.8     0.51  0.67   12.9     0.62  0.67   11.8
ITEM 12           0.35  0.54   14.5     0.46  0.53   13.4     0.25  0.49   15.7     0.35  0.48   14.5     0.25  0.49   15.7     0.30  0.45   15.1
ITEM 13           0.47  0.64   13.3     0.57  0.64   12.3     0.28  0.50   15.4     0.31  0.48   15.0     0.28  0.50   15.3     0.35  0.53   14.6
ITEM 14           0.67  0.72   11.2     0.81  0.70    9.4     0.42  0.68   13.8     0.55  0.67   12.5     0.48  0.65   13.2     0.56  0.69   12.4
ITEM 15           0.59  0.66   12.1     0.74  0.67   10.5     0.38  0.44   14.2     0.46  0.61   13.4     0.42  0.55   13.8     0.50  0.61   13.0
ITEM 16           0.70  0.68   10.9     0.81  0.67    9.5     0.50  0.57   13.0     0.58  0.54   12.2     0.51  0.63   12.9     0.63  0.61   11.6
ITEM 17           0.72  0.64   10.7     0.82  0.64    9.4     0.52  0.52   12.8     0.61  0.55   11.9     0.54  0.56   12.6     0.64  0.56   11.6

   MEAN           0.60  0.62   11.9     0.72  0.61   10.6     0.43  0.53   13.7     0.52  0.54   12.8     0.44  0.54   13.6     0.53  0.56   12.7
   S.D.           0.13  0.08    1.4     0.13  0.09    1.5     0.12  0.09    1.3     0.13  0.10    1.4     0.12  0.08    1.3     0.13  0.08    1.3

SUMMARY:
                       MEAN    S.D.          MEAN    S.D.          MEAN    S.D.          MEAN    S.D.          MEAN    S.D.          MEAN    S.D.
FORMULA SCORE           7.8     5.0          10.5     4.3           4.0     4.3           5.8     4.5           4.3     4.5           6.3     4.7
# RIGHT                10.0     3.9          12.0     3.3           6.9     3.3           8.3     3.5           7.3     3.4           8.8     3.6
# WRONG                 6.4     3.8           4.6     3.1           8.6     3.6           7.4     3.4           8.9     3.5           7.5     3.6
# OMITS                 0.2     0.7           0.2     0.7           0.4     0.9           0.3     0.9           0.2     0.7           0.3     0.8
# NOT REACHED           0.4     1.3           0.3     1.0           1.2     2.3           1.0     2.1           0.5     1.6           0.5     1.5

COEFFICIENT ALPHA         0.79                  0.75                  0.68                  0.71                  0.71                  0.73
SAMPLE SIZE               8148                  8431                  1331                  1606                  2046                  2067
POPULATION ESTIMATE    1326207               1362683                206459                227568                260869                211279
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D16

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                                        HSB 1980 SOPHOMORES
                                         CIVICS EDUCATION

                             MALE                  FEMALE                  TOTAL
                     ------------------    ------------------    ------------------
                      P+    RBIS  DELTA     P+    RBIS  DELTA     P+    RBIS  DELTA

ITEM  1              0.95  0.65    6.6     0.96  0.59    5.9     0.95  0.63    6.3
ITEM  2              0.59  0.56   12.1     0.65  0.53   11.4     0.62  0.55   11.8
ITEM  3              0.67  0.63   11.8     0.63  0.60   11.6     0.63  0.61   11.7
ITEM  4              0.59  0.62   12.1     0.60  0.56   11.9     0.60  0.59   12.0
ITEM  5              0.64  0.66   11.6     0.63  0.61   11.7     0.63  0.63   11.6
ITEM  6              0.33  0.54   14.7     0.26  0.50   15.6     0.29  0.51   15.2
ITEM  7              0.49  0.53   13.1     0.59  0.54   12.1     0.54  0.54   12.6
ITEM  8              0.56  0.55   12.4     0.61  0.57   11.9     0.58  0.56   12.1
ITEM  9              0.59  0.63   12.1     0.62  0.66   11.8     0.61  0.64   11.9
ITEM 10              0.41  0.48   13.9     0.43  0.50   13.7     0.42  0.49   13.8

   MEAN              0.58  0.59   12.0     0.60  0.56   11.8     0.59  0.58   11.9
   S.D.              0.15  0.06    2.0     0.17  0.05    2.3     0.16  0.05    2.2

SUMMARY:
                        MEAN     S.D.          MEAN     S.D.          MEAN     S.D.
FORMULA SCORE            4.3     2.7            4.6     2.6            4.5     2.7
# RIGHT                  5.7     2.1            5.9     2.0            5.8     2.0
# WRONG                  4.1     2.1            3.9     2.0            4.0     2.0
# OMITS                  0.0     0.3            0.1     0.3            0.1     0.3
# NOT REACHED            0.1     0.7            0.1     0.6            0.1     0.7

COEFFICIENT ALPHA          0.54                   0.49                   0.52
SAMPLE SIZE               11758                  12327                  24085
POPULATION ESTIMATE     1824931                1824325                3649257
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D17

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                              HSB 1980 SOPHOMORES
                               CIVICS EDUCATION

                    WHITE               BLACK              HISPANIC              TOTAL
              ------------------  ------------------  ------------------  ------------------
               P+   RBIS  DELTA    P+   RBIS  DELTA    P+   RBIS  DELTA    P+   RBIS  DELTA

ITEM  1       0.97  0.62   5.7    0.93  0.53   7.1    0.91  0.64   7.7    0.95  0.63   6.3
ITEM  2       0.64  0.55  11.5    0.56  0.53  12.4    0.55  0.55  12.5    0.62  0.55  11.8
ITEM  3       0.67  0.61  11.3    0.52  0.55  12.7    0.51  0.59  12.9    0.63  0.61  11.7
ITEM  4       0.62  0.59  11.8    0.55  0.56  12.5    0.51  0.60  12.9    0.60  0.59  12.0
ITEM  5       0.67  0.63  11.3    0.52  0.58  12.8    0.54  0.62  12.6    0.63  0.63  11.6
ITEM  6       0.32  0.53  14.9    0.22  0.40  16.1    0.22  0.38  16.1    0.29  0.51  15.2
ITEM  7       0.57  0.54  12.3    0.48  0.49  13.2    0.47  0.51  13.3    0.54  0.54  12.6
ITEM  8       0.62  0.56  11.8    0.49  0.49  13.1    0.49  0.50  13.1    0.58  0.56  12.1
ITEM  9       0.65  0.66  11.5    0.49  0.55  13.1    0.46  0.54  13.4    0.61  0.64  11.9
ITEM 10       0.44  0.49  13.6    0.37  0.48  14.3    0.37  0.46  14.4    0.42  0.49  13.8

   MEAN       0.62  0.58  11.6    0.51  0.52  12.7    0.50  0.54  12.9    0.59  0.58  11.9
   S.D.       0.16  0.05   2.3    0.17  0.05   2.1    0.16  0.08   2.0    0.16  0.05   2.2

SUMMARY:
                 MEAN     S.D.        MEAN     S.D.        MEAN     S.D.        MEAN     S.D.
FORMULA SCORE     4.8     2.6          3.5     2.4          3.4     2.6          4.5     2.7
# RIGHT           6.1     2.0          5.0     1.9          5.0     1.9          5.8     2.0
# WRONG           3.7     2.0          4.6     1.9          4.8     2.0          4.0     2.0
# OMITS           0.1     0.3          0.1     0.4          0.1     0.4          0.1     0.3
# NOT REACHED     0.1     0.6          0.3     0.9          0.2     0.7          0.1     0.7

COEFFICIENT ALPHA     0.51               0.40                0.45                0.52
SAMPLE SIZE          16455               2879                4067               24085
POPULATION ESTIMATE 2668144             424941              468731             3649257
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HSB 1980 SOPHO
CIVICS EDUCAT

	WHITE MALE			WHITE FEMALE			BLACK MA	
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS
ITEM 1	0.96	0.66	6.1	0.98	0.52	5.1	0.93	0.49
ITEM 2	0.61	0.56	11.9	0.69	0.53	11.2	0.55	0.56
ITEM 3	0.66	0.62	11.4	0.67	0.60	11.2	0.52	0.57
ITEM 4	0.62	0.62	11.8	0.63	0.55	11.7	0.54	0.58
ITEM 5	0.68	0.66	11.2	0.66	0.60	11.3	0.52	0.57
ITEM 6	0.36	0.55	14.4	0.28	0.52	15.4	0.25	0.40
ITEM 7	0.52	0.54	12.8	0.61	0.53	11.8	0.44	0.48
ITEM 8	0.59	0.56	12.1	0.64	0.56	11.5	0.48	0.45
ITEM 9	0.63	0.65	11.7	0.67	0.66	11.3	0.49	0.51
ITEM 10	0.42	0.48	13.8	0.45	0.50	13.5	0.36	0.48
MEAN	0.60	0.59	11.7	0.63	0.56	11.4	0.51	0.51
S.D.	0.15	0.06	2.1	0.17	0.05	2.5	0.17	0.06

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S
FORMULA SCORE	4.7	2.7	5.0	2.5	3.4	2
# RIGHT	6.0	2.1	6.2	1.9	4.9	1
# WRONG	3.9	2.1	3.6	1.9	4.7	1
# OMITS	0.0	0.3	0.1	0.3	0.1	0
# NOT REACHED	0.1	0.6	0.1	0.6	0.3	1

COEFFICIENT ALPHA	0.54	0.47	0.39
SAMPLE SIZE	8090	8365	1302
POPULATION ESTIMATE	1316715	1351428	201874

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OMORES
TION

LE        BLACK FEMALE          HISPANIC MALE         HISPANIC FEMALE
------  ------------------   ------------------   ------------------
DELTA    P+    RBIS  DELTA    P+    RBIS  DELTA    P+    RBIS  DELTA
  7.0   0.93  0.57    7.2   0.90  0.66    7.9   0.92  0.61    7.4
 12.5   0.57  0.49   12.3   0.51  0.56   12.9   0.60  0.54   12.0
 12.8   0.53  0.52   12.7   0.52  0.60   12.8   0.49  0.58   13.1
 12.6   0.56  0.54   12.4   0.51  0.61   12.9   0.52  0.59   12.8
 12.8   0.52  0.59   12.8   0.53  0.63   12.7   0.55  0.60   12.5
 15.7   0.20  0.41   16.4   0.24  0.43   15.8   0.19  0.33   16.5
 13.6   0.51  0.49   12.9   0.44  0.48   13.6   0.51  0.55   12.9
 13.2   0.51  0.53   12.9   0.47  0.49   13.3   0.53  0.51   12.7
 13.1   0.49  0.59   13.1   0.46  0.52   13.4   0.46  0.56   13.4
 14.5   0.39  0.48   14.2   0.35  0.43   14.6   0.39  0.49   14.1

 12.8   0.52  0.52   12.7   0.49  0.54   13.0   0.52  0.54   12.7
  2.1   0.17  0.05    2.2   0.16  0.08    1.9   0.17  0.08    2.1

.D.        MEAN    S.D.          MEAN    S.D.          MEAN    S.D.
.4          3.6    2.4            3.2    2.6            3.5    2.5
.9          5.1    1.9            4.9    2.0            5.1    1.9
.9          4.6    1.9            4.9    2.0            4.7    2.0
.4          0.1    0.4            0.1    0.3            0.1    0.4
.0          0.3    0.9            0.2    0.7            0.2    0.7

              0.40                  0.46                  0.45
              1577                  2018                  2049
            223067                259239                209493
```

APPENDIX E

HS&B 1982 Senior Item Analysis Tables

E1	1982 Vocabulary Male-Female
E2	1982 Vocabulary White-Black-Hispanic
E3	1982 Vocabulary White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
E4	1982 Reading Male-Female
E5	1982 Reading White-Black-Hispanic
E6	1982 Reading White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
E7	1982 Mathematics Male-Female
E8	1982 Mathematics White-Black-Hispanic
E9	1982 Mathematics White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
E10	1982 Science Male-Female
E11	1982 Science White-Black-Hispanic
E12	1982 Science White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
E13	1982 Writing Male-Female
E14	1982 Writing White-Black-Hispanic
E15	1982 Writing White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female
E16	1982 Civics Education Male-Female
E17	1982 Civics Education White-Black-Hispanic
E18	1982 Civics Education White Male-White Female-Black Male-Black Female-Hispanic Male-Hispanic Female

E1

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                                 HSB 1982 SENIORS
                                    VOCABULARY

                        MALE                  FEMALE                  TOTAL
               ------------------    ------------------    ------------------
                P+    RBIS  DELTA     P+    RBIS  DELTA     P+    RBIS  DELTA

ITEM  1        0.77  0.80  10.0     0.79  0.79   9.7     0.78  0.79   9.9
ITEM  2        0.91  0.83   7.6     0.86  0.80   8.6     0.89  0.81   8.2
ITEM  3        0.74  0.83  10.4     0.75  0.83  10.4     0.74  0.83  10.4
ITEM  4        0.82  0.76   9.3     0.80  0.75   9.6     0.81  0.75   9.5
ITEM  5        0.83  0.79   9.2     0.84  0.78   9.0     0.83  0.78   9.1
ITEM  6        0.59  0.76  12.0     0.55  0.74  12.5     0.57  0.75  12.3
ITEM  7        0.62  0.74  11.7     0.70  0.79  10.9     0.66  0.76  11.3
ITEM  8        0.84  0.82   9.0     0.77  0.80  10.1     0.80  0.81   9.6
ITEM  9        0.67  0.76  11.2     0.73  0.80  10.5     0.70  0.78  10.9
ITEM 10        0.69  0.71  11.1     0.60  0.62  12.0     0.64  0.66  11.6
ITEM 11        0.75  0.73  10.3     0.73  0.72  10.6     0.74  0.72  10.4
ITEM 12        0.82  0.67   9.4     0.71  0.62  10.8     0.76  0.64  10.1
ITEM 13        0.47  0.69  13.3     0.53  0.71  12.7     0.50  0.70  13.0
ITEM 14        0.35  0.69  14.6     0.38  0.71  14.2     0.36  0.70  14.4
ITEM 15        0.32  0.45  14.9     0.32  0.45  14.9     0.32  0.45  14.9
ITEM 16        0.54  0.58  12.6     0.58  0.60  12.2     0.56  0.58  12.4
ITEM 17        0.47  0.68  13.3     0.44  0.62  13.6     0.45  0.65  13.5
ITEM 18        0.36  0.57  14.5     0.32  0.53  14.9     0.34  0.55  14.7
ITEM 19        0.28  0.19  15.3     0.32  0.27  14.9     0.30  0.23  15.1
ITEM 20        0.26  0.43  15.6     0.25  0.46  15.7     0.26  0.44  15.6
ITEM 21        0.36  0.57  14.4     0.42  0.66  13.8     0.39  0.62  14.1

   MEAN        0.59  0.67  11.9     0.59  0.67  12.0     0.59  0.67  11.9
   S.D.        0.21  0.16   2.3     0.19  0.14   2.1     0.20  0.15   2.2

SUMMARY:
                   MEAN     S.D.         MEAN     S.D.         MEAN     S.D.
FORMULA SCORE      10.4     5.6          10.3     5.8          10.4     5.7
# RIGHT            12.4     4.6          12.3     4.7          12.4     4.7
# WRONG             7.6     4.5           7.9     4.6           7.9     4.6
# OMITS             0.6     1.7           0.6     1.7           0.6     1.7
# NOT REACHED       0.2     1.2           0.1     0.9           0.2     1.0

COEFFICIENT ALPHA      0.84                  0.85                  0.84
SAMPLE SIZE           12865                 13253                 26118
POPULATION ESTIMATE  1879443               1887097               3766540
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E2

HSB 1982 SENIORS
VOCABULARY

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.85	0.77	8.8	0.57	0.70	12.3	0.62	0.71	11.8	0.78	0.79	9.9
ITEM 2	0.94	0.81	6.9	0.73	0.67	10.6	0.76	0.72	10.2	0.89	0.81	8.2
ITEM 3	0.81	0.83	9.5	0.56	0.75	12.3	0.57	0.75	12.3	0.74	0.83	10.4
ITEM 4	0.89	0.69	8.1	0.58	0.69	12.2	0.62	0.67	11.8	0.81	0.75	9.5
ITEM 5	0.88	0.78	8.2	0.69	0.66	11.0	0.70	0.71	10.9	0.83	0.78	9.1
ITEM 6	0.64	0.74	11.6	0.38	0.60	14.3	0.39	0.67	14.1	0.57	0.75	12.3
ITEM 7	0.73	0.74	10.6	0.46	0.68	13.4	0.48	0.68	13.2	0.66	0.76	11.3
ITEM 8	0.87	0.80	8.5	0.58	0.69	12.2	0.63	0.71	11.6	0.80	0.81	9.6
ITEM 9	0.77	0.77	10.1	0.52	0.72	12.8	0.53	0.67	12.7	0.70	0.78	10.9
ITEM 10	0.70	0.65	10.9	0.41	0.53	13.9	0.51	0.57	12.9	0.64	0.66	11.6
ITEM 11	0.79	0.74	9.7	0.60	0.61	12.0	0.58	0.59	12.2	0.74	0.72	10.4
ITEM 12	0.82	0.62	9.4	0.59	0.47	12.1	0.61	0.56	11.9	0.76	0.64	10.1
ITEM 13	0.56	0.71	12.4	0.33	0.56	14.8	0.34	0.57	14.6	0.50	0.70	13.0
ITEM 14	0.42	0.70	13.8	0.21	0.59	16.2	0.20	0.61	16.3	0.36	0.70	14.4
ITEM 15	0.34	0.49	14.6	0.24	0.27	15.8	0.25	0.33	15.7	0.32	0.45	14.9
ITEM 16	0.60	0.57	12.0	0.43	0.56	13.7	0.45	0.57	13.5	0.56	0.58	12.4
ITEM 17	0.50	0.66	13.0	0.31	0.54	15.0	0.32	0.55	14.9	0.45	0.65	13.5
ITEM 18	0.37	0.56	14.3	0.25	0.44	15.8	0.22	0.40	16.1	0.34	0.55	14.7
ITEM 19	0.31	0.24	15.0	0.26	0.22	15.5	0.31	0.23	15.0	0.30	0.23	15.1
ITEM 20	0.27	0.51	15.4	0.22	0.28	16.0	0.21	0.28	16.2	0.26	0.44	15.6
ITEM 21	0.44	0.62	13.7	0.23	0.49	16.0	0.29	0.53	15.2	0.39	0.62	14.1
MEAN	0.64	0.67	11.3	0.44	0.56	13.7	0.46	0.57	13.5	0.59	0.67	11.9
S.D.	0.21	0.14	2.5	0.16	0.15	1.7	0.17	0.14	1.8	0.20	0.15	2.2

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	11.7	5.2	6.4	5.3	6.9	5.4	10.4	5.7
# RIGHT	13.4	4.3	9.1	4.3	9.5	4.4	12.4	4.7
# WRONG	6.9	4.1	10.8	4.6	10.5	4.5	7.9	4.6
# OMITS	0.5	1.6	0.8	2.1	0.7	2.0	0.6	1.7
# NOT REACHED	0.1	0.9	0.3	1.4	0.3	1.3	0.2	1.0
COEFFICIENT ALPHA	0.82		0.79		0.80		0.84	
SAMPLE SIZE	17212		3467		4599		26118	
POPULATION ESTIMATE	2727355		456832		474738		3766540	

HSB 1982 SENIORS
VOCABULARY

	WHITE MALE			WHITE FEMALE			BLACK MALE			BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.84	0.78	9.0	0.86	0.77	8.6	0.59	0.71	12.1	0.55	0.69	12.5	0.60	0.73	12.0	0.64	0.68	11.6
ITEM 2	0.95	0.87	6.3	0.92	0.81	7.4	0.80	0.73	9.6	0.66	0.62	11.3	0.79	0.74	9.8	0.73	0.71	10.6
ITEM 3	0.80	0.84	9.7	0.82	0.82	9.4	0.64	0.76	11.6	0.50	0.72	13.0	0.56	0.76	12.4	0.58	0.73	12.2
ITEM 4	0.89	0.70	8.0	0.88	0.68	8.2	0.61	0.73	11.9	0.55	0.65	12.5	0.65	0.67	11.4	0.58	0.67	12.2
ITEM 5	0.87	0.79	8.4	0.89	0.77	8.1	0.70	0.68	10.9	0.68	0.64	11.2	0.69	0.71	11.0	0.72	0.70	10.7
ITEM 6	0.67	0.74	11.3	0.61	0.75	11.8	0.39	0.66	14.2	0.37	0.56	14.4	0.39	0.68	14.1	0.39	0.66	14.1
ITEM 7	0.69	0.73	11.0	0.77	0.77	10.0	0.46	0.66	13.4	0.45	0.69	13.5	0.45	0.67	13.5	0.52	0.69	12.8
ITEM 8	0.90	0.83	7.8	0.86	0.78	9.0	0.66	0.69	11.4	0.51	0.69	12.9	0.67	0.73	11.2	0.59	0.69	12.1
ITEM 9	0.74	0.76	10.5	0.80	0.80	9.7	0.53	0.73	12.7	0.52	0.72	12.8	0.48	0.66	13.2	0.58	0.71	12.2
ITEM 10	0.75	0.71	10.3	0.65	0.61	11.4	0.45	0.61	13.5	0.37	0.43	14.3	0.54	0.62	12.6	0.48	0.50	13.2
ITEM 11	0.81	0.75	9.5	0.78	0.74	9.9	0.62	0.62	11.8	0.59	0.60	12.1	0.60	0.59	12.0	0.56	0.58	12.4
ITEM 12	0.88	0.64	8.4	0.76	0.64	10.2	0.64	0.57	11.6	0.54	0.36	12.6	0.66	0.59	11.3	0.54	0.54	12.6
ITEM 13	0.53	0.72	12.7	0.59	0.71	12.1	0.33	0.56	14.8	0.33	0.57	14.7	0.32	0.53	14.8	0.36	0.63	14.4
ITEM 14	0.40	0.70	14.0	0.43	0.70	13.7	0.22	0.58	16.1	0.20	0.61	16.4	0.19	0.56	16.5	0.22	0.66	16.1
ITEM 15	0.34	0.49	14.6	0.34	0.48	14.6	0.24	0.30	15.8	0.25	0.24	15.7	0.26	0.29	15.6	0.25	0.38	15.7
ITEM 16	0.57	0.57	12.3	0.62	0.57	11.7	0.44	0.54	13.6	0.42	0.58	13.8	0.44	0.58	13.6	0.46	0.55	13.4
ITEM 17	0.52	0.68	12.8	0.49	0.64	13.1	0.33	0.63	14.8	0.30	0.44	15.1	0.32	0.57	14.9	0.32	0.52	14.8
ITEM 18	0.39	0.59	14.1	0.35	0.55	14.6	0.28	0.48	15.3	0.22	0.38	16.1	0.23	0.45	16.0	0.22	0.33	16.1
ITEM 19	0.28	0.19	15.3	0.33	0.28	14.8	0.26	0.20	15.5	0.26	0.25	15.5	0.31	0.21	15.0	0.31	0.26	15.0
ITEM 20	0.28	0.49	15.4	0.27	0.52	15.5	0.25	0.23	15.7	0.20	0.32	16.3	0.21	0.28	16.3	0.22	0.29	16.1
ITEM 21	0.40	0.58	14.0	0.47	0.66	13.3	0.24	0.48	15.9	0.23	0.49	16.0	0.27	0.48	15.4	0.32	0.58	14.9
MEAN	0.64	0.67	11.2	0.64	0.67	11.3	0.46	0.58	13.4	0.41	0.54	14.0	0.46	0.58	13.5	0.46	0.57	13.5
S.D.	0.22	0.15	2.7	0.21	0.13	2.4	0.18	0.16	1.9	0.15	0.15	1.6	0.18	0.15	1.9	0.16	0.14	1.7

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	11.7	5.1	11.7	5.3	7.0	5.4	5.8	5.1	6.9	5.3	6.9	5.5
# RIGHT	13.4	4.2	13.4	4.3	9.6	4.4	8.6	4.2	9.5	4.4	9.5	4.5
# WRONG	6.9	4.1	6.9	4.2	10.4	4.6	11.2	4.5	10.3	4.5	10.7	4.6
# OMITS	0.6	1.6	0.5	1.5	0.7	1.8	0.9	2.4	0.8	2.3	0.6	1.6
# NOT REACHED	0.2	1.0	0.1	0.7	0.4	1.5	0.3	1.3	0.3	1.5	0.2	1.2
COEFFICIENT ALPHA	0.82		0.83		0.80		0.77		0.80		0.80	
SAMPLE SIZE	8465		8747		1619		1949		2399		2300	
POPULATION ESTIMATE	1340391		1386964		217227		239606		261109		213628	

E4

HSB 1982 SENIORS
READING

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.92	0.61	7.4	0.92	0.57	7.4	0.92	0.59	7.4
ITEM 2	0.82	0.64	9.4	0.82	0.62	9.3	0.82	0.63	9.3
ITEM 3	0.75	0.64	10.2	0.77	0.56	10.0	0.76	0.60	10.1
ITEM 5	0.66	0.67	11.3	0.61	0.66	11.9	0.63	0.66	11.6
ITEM 6	0.55	0.60	12.5	0.55	0.66	12.5	0.55	0.63	12.5
ITEM 7	0.46	0.58	13.4	0.46	0.59	13.4	0.46	0.58	13.4
ITEM 8	0.47	0.71	13.3	0.42	0.65	13.9	0.45	0.69	13.5
ITEM 9	0.18	0.39	16.7	0.18	0.54	16.6	0.18	0.47	16.6
ITEM 10	0.45	0.58	13.6	0.55	0.62	12.5	0.50	0.60	13.0
ITEM 11	0.35	0.52	14.5	0.32	0.51	14.9	0.33	0.51	14.7
ITEM 12	0.75	0.65	10.3	0.81	0.58	9.6	0.78	0.61	9.9
ITEM 13	0.54	0.73	12.6	0.53	0.75	12.7	0.53	0.74	12.7
ITEM 14	0.69	0.69	11.0	0.65	0.66	11.5	0.67	0.68	11.3
ITEM 15	0.42	0.68	13.8	0.39	0.66	14.1	0.41	0.67	14.0
ITEM 16	0.49	0.66	13.1	0.54	0.70	12.6	0.52	0.68	12.8
ITEM 17	0.33	0.56	14.7	0.36	0.55	14.4	0.35	0.55	14.6
ITEM 18	0.47	0.68	13.3	0.37	0.66	14.3	0.42	0.67	13.8
ITEM 19	0.27	0.45	15.5	0.25	0.39	15.7	0.26	0.42	15.6
ITEM 20	0.49	0.65	13.1	0.51	0.65	12.9	0.50	0.65	13.0
MEAN	0.53	0.62	12.6	0.53	0.61	12.6	0.53	0.61	12.6
S.D.	0.19	0.09	2.2	0.20	0.08	2.3	0.19	0.08	2.2

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	7.7	5.1	7.6	5.0	7.7	5.1
# RIGHT	9.8	4.2	9.8	4.1	9.8	4.2
# WRONG	8.5	4.0	8.6	4.0	8.5	4.0
# OMITS	0.1	0.6	0.1	0.6	0.1	0.6
# NOT REACHED	0.6	1.9	0.6	1.9	0.6	1.9

COEFFICIENT ALPHA	0.81	0.80	0.80
SAMPLE SIZE	12773	13175	25948
POPULATION ESTIMATE	1867160	1877582	3744742

E5

HSB 1982 SENIORS
READING

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.94	0.58	6.7	0.86	0.52	8.7	0.85	0.57	8.9	0.92	0.59	7.4
ITEM 2	0.86	0.61	8.6	0.70	0.57	10.8	0.69	0.59	11.0	0.82	0.63	9.3
ITEM 3	0.80	0.63	9.7	0.66	0.50	11.3	0.66	0.48	11.3	0.76	0.60	10.1
ITEM 5	0.68	0.65	11.1	0.53	0.62	12.7	0.48	0.60	13.2	0.63	0.66	11.6
ITEM 6	0.60	0.60	12.0	0.41	0.62	13.9	0.40	0.65	14.0	0.55	0.63	12.5
ITEM 7	0.50	0.59	13.0	0.32	0.48	14.8	0.37	0.47	14.4	0.46	0.58	13.4
ITEM 8	0.50	0.69	13.0	0.30	0.51	15.1	0.30	0.64	15.1	0.45	0.69	13.5
ITEM 9	0.19	0.52	16.5	0.14	0.23	17.3	0.16	0.29	17.0	0.18	0.47	16.6
ITEM 10	0.54	0.59	12.6	0.39	0.53	14.2	0.38	0.51	14.2	0.50	0.60	13.0
ITEM 11	0.36	0.52	14.4	0.24	0.43	15.8	0.26	0.38	15.6	0.33	0.51	14.7
ITEM 12	0.81	0.62	9.4	0.71	0.53	10.8	0.65	0.56	11.4	0.78	0.61	9.9
ITEM 13	0.59	0.73	12.1	0.35	0.70	14.5	0.37	0.65	14.3	0.53	0.74	12.7
ITEM 14	0.72	0.67	10.7	0.53	0.62	12.7	0.52	0.64	12.8	0.67	0.68	11.3
ITEM 15	0.45	0.65	13.5	0.25	0.67	15.7	0.27	0.65	15.5	0.41	0.67	14.0
ITEM 16	0.57	0.68	12.3	0.34	0.57	14.6	0.37	0.56	14.3	0.52	0.68	12.8
ITEM 17	0.38	0.56	14.3	0.26	0.44	15.5	0.25	0.46	15.7	0.35	0.55	14.6
ITEM 18	0.47	0.67	13.3	0.24	0.58	15.8	0.29	0.53	15.2	0.42	0.67	13.8
ITEM 19	0.28	0.44	15.4	0.19	0.20	16.4	0.21	0.28	16.2	0.26	0.42	15.6
ITEM 20	0.55	0.64	12.5	0.34	0.55	14.7	0.34	0.60	14.6	0.50	0.65	13.0
MEAN	0.57	0.61	12.2	0.41	0.52	14.0	0.41	0.53	13.9	0.53	0.61	12.6
S.D.	0.19	0.07	2.3	0.19	0.13	2.2	0.18	0.11	2.0	0.19	0.08	2.2

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	8.6	5.0	4.8	4.1	4.9	4.3	7.7	5.1
# RIGHT	10.6	4.1	7.3	3.4	7.5	3.6	9.8	4.2
# WRONG	7.9	3.9	10.0	3.7	10.5	3.7	8.5	4.0
# OMITS	0.1	0.5	0.2	0.9	0.1	0.6	0.1	0.6
# NOT REACHED	0.4	1.5	1.4	2.9	0.9	2.4	0.6	1.9

COEFFICIENT ALPHA	0.80	0.70	0.72	0.80
SAMPLE SIZE	17085	3458	4669	25948
POPULATION ESTIMATE	2709116	455962	472753	3744742

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                                                                                          HSB 198
                                                                                              READ

                         WHITE MALE              WHITE FEMALE               BLAC
                   -------------------     -------------------      ---------
                    P+     RBIS   DELTA     P+     RBIS   DELTA       P+     RB
   ITEM  1         0.94   0.62     6.8     0.95   0.54     6.5      0.88   0.
   ITEM  2         0.86   0.63     8.7     0.87   0.60     8.6      0.70   0.
   ITEM  3         0.79   0.67     9.7     0.80   0.59     9.6      0.66   0.
   ITEM  5         0.71   0.66    10.8     0.65   0.65    11.[illegible]     0.59   0.
   ITEM  6         0.59   0.57    12.1     0.60   0.63    12.0      0.45   0.
   ITEM  7         0.49   0.60    13.1     0.50   0.51    13.0      0.35   0.
   ITEM  8         0.53   0.71    12.7     0.47   0.68    13.3      0.31   0.
   ITEM  9         0.18   0.46    16.6     0.20   0.59    16.4      0.14   0.1
   ITEM 10         0.48   0.59    13.2     0.60   0.61    12.0      0.37   0.
   ITEM 11         0.38   0.52    14.2     0.35   0.51    14.6      0.28   0.4
   ITEM 12         0.79   0.66     9.7     0.83   0.58     9.1      0.68   0.5
   ITEM 13         0.59   0.72    12.1     0.59   0.74    12.1      0.41   0.6
   ITEM 14         0.73   0.69    10.5     0.70   0.66    10.9      0.55   0.6
   ITEM 15         0.47   0.65    13.3     0.43   0.64    13.7      0.29   0.6
   ITEM 16         0.54   0.68    12.6     0.60   0.69    12.0      0.35   0.5
   ITEM 17         0.36   0.57    14.4     0.39   0.55    14.1      0.27   0.3
   ITEM 18         0.52   0.68    12.8     0.41   0.67    13.9      0.28   0.6
   ITEM 19         0.29   0.47    15.2     0.26   0.42    15.6      0.20   0.1
   ITEM 20         0.54   0.65    12.6     0.56   0.64    12.4      0.35   0.5

      MEAN         0.57   0.62    12.2     0.57   0.61    12.2      0.43   0.5
      S.D.         0.19   0.07     2.3     0.20   0.07     2.4      0.19   0.1

 SUMMARY:

                        MEAN      S.D.          MEAN      S.D.          MEAN
 FORMULA SCORE           8.7      5.0            8.6      4.9            5.2
 # RIGHT                10.6      4.1           10.6      4.0            7.6
 # WRONG                 7.9      4.0            8.0      3.9            9.7
 # OMITS                 0.1      0.6            0.1      0.5            0.2
 # NOT REACHED           0.4      1.6            0.3      1.4            1.5

 COEFFICIENT ALPHA          0.80                    0.79                    0.7
 SAMPLE SIZE                3403                    3635                    161
 POPULATION ESTIMATE     1331023                 1378963                  21646
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SENIORS
ING

K MALE		BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
IS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
56	8.3	0.94	0.49	9.0	0.86	0.57	8.7	0.84	0.57	9.1
60	10.9	0.71	0.55	10.8	0.71	0.59	10.8	0.66	0.59	11.3
64	11.3	0.66	0.47	11.4	0.64	0.53	11.6	0.69	0.42	11.0
67	12.1	0.47	0.57	13.3	0.49	0.62	13.1	0.47	0.58	13.3
60	13.5	0.37	0.64	14.3	0.40	0.62	14.0	0.39	0.67	14.1
64	14.6	0.31	0.50	15.0	0.37	0.42	14.3	0.37	0.53	14.4
69	14.9	0.29	0.44	15.2	0.31	0.65	15.0	0.29	0.63	15.3
3	17.3	0.14	0.33	17.3	0.17	0.19	16.8	0.14	0.44	17.3
1	14.3	0.39	0.56	14.1	0.35	0.48	14.6	0.42	0.56	13.8
5	15.3	0.20	0.38	16.3	0.26	0.37	15.6	0.26	0.39	15.6
7	11.1	0.73	0.51	10.6	0.61	0.58	11.9	0.70	0.55	10.9
6	14.0	0.30	0.73	15.0	0.38	0.66	14.2	0.36	0.64	14.4
5	12.5	0.51	0.59	12.9	0.55	0.65	12.5	0.50	0.62	13.0
8	15.2	0.21	0.64	16.2	0.28	0.68	15.4	0.26	0.60	15.6
7	14.6	0.34	0.58	14.6	0.37	0.52	14.3	0.37	0.60	14.3
4	15.5	0.26	0.54	15.6	0.23	0.50	15.9	0.27	0.43	15.5
5	15.3	0.20	0.49	16.4	0.29	0.57	15.2	0.28	0.48	15.3
7	16.4	0.19	0.23	16.5	0.21	0.31	16.3	0.22	0.24	16.1
4	14.5	0.33	0.56	14.8	0.34	0.57	14.6	0.34	0.64	14.6
2	13.8	0.39	0.51	14.2	0.41	0.53	13.9	0.41	0.54	13.9
5	2.2	0.20	0.11	2.2	0.18	0.13	2.0	0.18	0.11	2.0

S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
4.2	4.5	4.0	4.9	4.3	4.9	4.3
3.6	7.1	3.3	7.6	3.6	7.5	3.6
3.7	10.3	3.7	10.5	3.7	10.4	3.8
0.8	0.3	0.9	0.1	0.7	0.1	0.5
3.0	1.3	2.8	0.8	2.3	1.0	2.6

1	0.69	0.72	0.72
4	1844	2379	2290
8	239494	259275	213478

E7

HSB 1982 SENIORS
MATHEMATICS

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.84	0.58	9.1	0.85	0.51	8.8	0.85	0.55	8.9
PART 1 ITEM 2	0.81	0.47	9.4	0.78	0.43	10.0	0.79	0.45	9.7
PART 1 ITEM 3	0.73	0.60	10.6	0.70	0.53	10.9	0.71	0.57	10.7
PART 1 ITEM 4	0.76	0.49	10.1	0.72	0.45	10.6	0.74	0.47	10.4
PART 1 ITEM 5	0.65	0.77	11.5	0.64	0.78	11.6	0.64	0.77	11.5
PART 1 ITEM 6	0.72	0.54	10.6	0.69	0.51	11.0	0.71	0.52	10.8
PART 1 ITEM 7	0.63	0.76	11.7	0.61	0.73	11.9	0.62	0.75	11.8
PART 1 ITEM 8	0.73	0.77	10.6	0.76	0.77	10.2	0.74	0.77	10.4
PART 1 ITEM 9	0.68	0.49	11.2	0.69	0.48	11.1	0.68	0.48	11.1
PART 1 ITEM 10	0.60	0.72	12.0	0.57	0.70	12.3	0.58	0.71	12.1
PART 1 ITEM 11	0.50	0.52	13.0	0.39	0.51	14.2	0.44	0.52	13.6
PART 1 ITEM 12	0.64	0.65	11.5	0.60	0.62	12.0	0.62	0.64	11.8
PART 1 ITEM 13	0.51	0.76	12.9	0.53	0.75	12.7	0.52	0.75	12.8
PART 1 ITEM 14	0.65	0.56	11.5	0.61	0.62	11.9	0.63	0.59	11.7
PART 1 ITEM 15	0.57	0.47	12.3	0.55	0.41	12.5	0.56	0.44	12.4
PART 1 ITEM 16	0.46	0.76	13.4	0.50	0.77	13.0	0.48	0.76	13.2
PART 1 ITEM 17	0.43	0.61	13.7	0.50	0.54	13.0	0.49	0.57	13.1
PART 1 ITEM 18	0.44	0.63	13.6	0.37	0.49	14.4	0.40	0.56	14.0
PART 1 ITEM 19	0.60	0.74	11.9	0.55	0.73	12.5	0.58	0.73	12.2
PART 1 ITEM 20	0.51	0.77	12.9	0.53	0.71	12.7	0.52	0.74	12.8
PART 1 ITEM 21	0.37	0.76	14.3	0.38	0.74	14.2	0.37	0.75	14.3
PART 1 ITEM 22	0.48	0.70	13.3	0.41	0.74	13.9	0.44	0.72	13.6
PART 1 ITEM 23	0.26	0.37	15.6	0.25	0.26	15.9	0.25	0.32	15.7
PART 1 ITEM 24	0.33	0.65	14.8	0.28	0.52	15.3	0.30	0.59	15.1
PART 1 ITEM 25	0.48	0.69	13.2	0.47	0.61	13.3	0.48	0.65	13.2
PART 1 ITEM 26	0.30	0.80	15.0	0.22	0.76	16.1	0.26	0.78	15.6
PART 1 ITEM 27	0.40	0.67	14.1	0.33	0.61	14.7	0.36	0.64	14.4
PART 1 ITEM 28	0.19	0.59	16.6	0.14	0.45	17.4	0.16	0.54	16.9
PART 2 ITEM 1	0.51	0.24	12.9	0.41	0.05	13.9	0.46	0.15	13.4
PART 2 ITEM 2	0.64	0.74	11.6	0.60	0.74	12.0	0.62	0.74	11.8
PART 2 ITEM 3	0.55	0.50	12.5	0.57	0.52	12.3	0.56	0.51	12.4
PART 2 ITEM 4	0.74	0.50	10.5	0.77	0.38	10.0	0.76	0.44	10.2
PART 2 ITEM 5	0.52	0.86	12.8	0.53	0.83	12.7	0.52	0.84	12.8
PART 2 ITEM 6	0.28	0.57	15.4	0.22	0.54	16.1	0.25	0.56	15.7
PART 2 ITEM 7	0.29	0.55	15.2	0.28	0.50	15.3	0.29	0.52	15.3
PART 2 ITEM 8	0.51	0.66	12.9	0.50	0.64	13.0	0.50	0.64	13.0
PART 2 ITEM 9	0.26	0.34	15.6	0.20	0.27	16.4	0.23	0.31	16.0
PART 2 ITEM 10	0.36	0.39	14.4	0.33	0.32	14.7	0.35	0.35	14.6
MEAN	0.53	0.61	12.7	0.50	0.57	13.0	0.51	0.59	12.9
S.D.	0.17	0.14	1.8	0.18	0.17	2.0	0.17	0.15	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	14.1	11.1	12.9	10.2	13.5	10.7
# RIGHT	19.8	8.6	18.9	7.9	19.3	8.2
# WRONG	17.1	8.3	17.9	7.7	17.5	8.0
# OMITS	0.5	1.6	0.6	1.9	0.6	1.8
# NOT REACHED P1	0.3	1.9	0.3	1.8	0.3	1.8
# NOT REACHED P2	0.3	1.6	0.3	1.5	0.3	1.6
COEFFICIENT ALPHA	0.91		0.89		0.90	
SAMPLE SIZE	12665		13025		25690	
POPULATION ESTIMATE	1850749		1856441		3707190	

E8

HSB 1982 SENIORS
MATHEMATICS

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.88	0.55	8.4	0.77	0.43	10.0	0.75	0.47	10.3	0.85	0.55	8.9
PART 1 ITEM 2	0.82	0.43	9.3	0.73	0.40	10.6	0.71	0.43	10.8	0.79	0.45	9.7
PART 1 ITEM 3	0.76	0.57	10.1	0.58	0.40	12.2	0.57	0.49	12.3	0.71	0.57	10.7
PART 1 ITEM 4	0.78	0.47	9.9	0.62	0.33	11.8	0.65	0.43	11.5	0.74	0.47	10.4
PART 1 ITEM 5	0.71	0.76	10.7	0.43	0.71	13.7	0.45	0.72	13.5	0.64	0.77	11.5
PART 1 ITEM 6	0.75	0.54	10.3	0.56	0.36	12.4	0.61	0.38	11.9	0.71	0.52	10.8
PART 1 ITEM 7	0.69	0.75	11.1	0.43	0.65	13.7	0.44	0.65	13.6	0.62	0.75	11.8
PART 1 ITEM 8	0.80	0.77	9.6	0.57	0.69	12.3	0.57	0.72	12.3	0.74	0.77	10.4
PART 1 ITEM 9	0.72	0.47	10.7	0.55	0.38	12.5	0.58	0.40	12.2	0.68	0.48	11.1
PART 1 ITEM 10	0.64	0.71	11.5	0.39	0.63	14.2	0.45	0.58	13.5	0.58	0.71	12.1
PART 1 ITEM 11	0.48	0.50	13.2	0.28	0.47	15.4	0.34	0.44	14.7	0.44	0.52	13.6
PART 1 ITEM 12	0.66	0.64	11.3	0.52	0.57	12.8	0.50	0.59	13.0	0.62	0.64	11.8
PART 1 ITEM 13	0.58	0.74	12.2	0.34	0.72	14.7	0.35	0.70	14.6	0.52	0.75	12.8
PART 1 ITEM 14	0.69	0.54	11.0	0.40	0.61	14.0	0.47	0.56	13.3	0.63	0.59	11.7
PART 1 ITEM 15	0.60	0.45	12.0	0.46	0.31	13.4	0.46	0.29	13.4	0.56	0.44	12.4
PART 1 ITEM 16	0.53	0.76	12.7	0.32	0.71	14.9	0.33	0.65	14.8	0.48	0.76	13.2
PART 1 ITEM 17	0.52	0.59	12.8	0.40	0.46	14.0	0.40	0.47	14.0	0.49	0.57	13.1
PART 1 ITEM 18	0.44	0.56	13.6	0.28	0.47	15.3	0.29	0.54	15.2	0.47	0.56	14.0
PART 1 ITEM 19	0.64	0.72	11.5	0.36	0.66	14.5	0.41	0.66	13.9	0.59	0.73	12.2
PART 1 ITEM 20	0.59	0.74	12.1	0.32	0.60	14.8	0.34	0.65	14.6	0.52	0.74	12.8
PART 1 ITEM 21	0.43	0.75	13.8	0.22	0.61	16.1	0.24	0.66	15.9	0.37	0.75	14.3
PART 1 ITEM 22	0.50	0.72	13.0	0.24	0.58	15.9	0.30	0.63	15.1	0.44	0.72	13.6
PART 1 ITEM 23	0.27	0.33	15.5	0.20	0.16	16.4	0.22	0.24	16.1	0.25	0.32	15.7
PART 1 ITEM 24	0.34	0.58	14.7	0.19	0.48	16.6	0.19	0.58	16.5	0.30	0.59	15.1
PART 1 ITEM 25	0.54	0.65	12.6	0.31	0.44	15.0	0.31	0.55	15.0	0.49	0.65	13.2
PART 1 ITEM 26	0.31	0.77	15.0	0.10	0.64	18.1	0.13	0.70	17.4	0.26	0.78	15.6
PART 1 ITEM 27	0.41	0.65	13.9	0.19	0.42	16.6	0.25	0.48	15.8	0.36	0.64	14.4
PART 1 ITEM 28	0.17	0.63	16.9	0.12	0.08	17.7	0.13	0.18	17.5	0.16	0.54	16.9
PART 2 ITEM 1	0.45	0.26	13.5	0.51	-0.13	12.9	0.49	-0.06	13.1	0.46	0.15	13.4
PART 2 ITEM 2	0.69	0.73	11.1	0.41	0.66	13.9	0.46	0.67	13.4	0.62	0.74	11.8
PART 2 ITEM 3	0.59	0.55	12.1	0.46	0.36	13.4	0.48	0.27	13.2	0.56	0.51	12.4
PART 2 ITEM 4	0.78	0.45	10.0	0.68	0.36	11.2	0.69	0.37	11.0	0.76	0.44	10.2
PART 2 ITEM 5	0.61	0.82	11.9	0.25	0.79	15.6	0.31	0.83	15.0	0.52	0.84	12.8
PART 2 ITEM 6	0.27	0.57	15.4	0.17	0.37	16.9	0.19	0.47	16.6	0.25	0.56	15.7
PART 2 ITEM 7	0.32	0.51	14.9	0.16	0.47	16.9	0.20	0.42	16.4	0.29	0.52	15.3
PART 2 ITEM 8	0.55	0.66	12.5	0.34	0.49	14.7	0.39	0.46	14.2	0.50	0.64	13.0
PART 2 ITEM 9	0.24	0.34	15.8	0.17	0.15	16.8	0.20	0.13	16.4	0.23	0.31	16.0
PART 2 ITEM 10	0.37	0.36	14.3	0.28	0.20	15.4	0.29	0.28	15.3	0.35	0.35	14.6
MEAN	0.56	0.59	12.4	0.38	0.47	14.4	0.40	0.49	14.1	0.51	0.59	12.9
S.D.	0.18	0.14	2.0	0.17	0.20	1.9	0.16	0.19	1.8	0.17	0.15	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	15.6	10.6	6.8	8.0	7.8	8.7	13.5	10.7
# RIGHT	21.0	8.1	14.1	6.2	14.9	6.7	19.3	8.2
# WRONG	16.1	7.9	21.9	6.5	21.5	7.0	17.5	8.0
# OMITS	0.5	1.7	0.9	2.1	0.6	1.7	0.6	1.8
# NOT REACHED P1	0.2	1.5	0.6	2.6	0.5	2.5	0.3	1.8
# NOT REACHED P2	0.2	1.4	0.6	2.1	0.4	1.6	0.3	1.6

COEFFICIENT ALPHA	0.90	0.81	0.84	0.90
SAMPLE SIZE	16946	3407	4607	25690
POPULATION ESTIMATE	2684122	450031	467050	3707190

HSB 1982 SENIORS
MATHEMATICS

	WHITE MALE			WHITE FEMALE			BLACK MALE			BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
PART 1 ITEM 1	0.87	0.59	8.5	0.89	0.52	8.3	0.78	0.45	10.0	0.77	0.41	10.1	0.71	0.51	10.8	0.79	0.66	9.7
PART 1 ITEM 2	0.86	0.45	8.7	0.80	0.42	9.6	0.75	0.38	10.3	0.71	0.41	10.8	0.72	0.69	10.7	0.70	0.37	10.9
PART 1 ITEM 3	0.79	0.69	9.8	0.74	0.55	10.4	0.59	0.48	12.1	0.57	0.32	12.3	0.55	0.52	12.5	0.58	0.66	12.2
PART 1 ITEM 4	0.80	0.49	9.6	0.76	0.44	10.2	0.66	0.32	11.5	0.59	0.33	12.1	0.66	0.45	11.4	0.63	0.61	11.6
PART 1 ITEM 5	0.72	0.76	10.6	0.71	0.77	10.9	0.43	0.72	13.7	0.44	0.70	13.6	0.44	0.72	13.6	0.44	0.72	13.6
PART 1 ITEM 6	0.77	0.55	10.1	0.74	0.53	10.5	0.58	0.39	12.2	0.55	0.34	12.5	0.63	0.42	11.7	0.58	0.34	12.2
PART 1 ITEM 7	0.70	0.77	10.9	0.67	0.73	11.3	0.42	0.66	13.9	0.45	0.64	13.5	0.45	0.66	13.5	0.42	0.64	13.8
PART 1 ITEM 8	0.79	0.78	9.8	0.81	0.78	9.4	0.56	0.67	12.4	0.59	0.71	12.1	0.55	0.73	12.5	0.59	0.71	12.0
PART 1 ITEM 9	0.72	0.48	10.7	0.72	0.67	10.6	0.55	0.60	12.5	0.55	0.36	12.5	0.59	0.40	12.1	0.57	0.60	12.3
PART 1 ITEM 10	0.66	0.74	11.4	0.63	0.69	11.7	0.42	0.61	13.9	0.36	0.65	14.6	0.49	0.56	13.2	0.42	0.62	13.8
PART 1 ITEM 11	0.55	0.53	12.5	0.42	0.50	13.8	0.33	0.48	14.7	0.22	0.47	16.0	0.37	0.45	14.4	0.30	0.43	15.1
PART 1 ITEM 12	0.69	0.65	11.0	0.63	0.63	11.6	0.53	0.58	12.7	0.52	0.57	12.8	0.50	0.61	13.0	0.50	0.56	13.0
PART 1 ITEM 13	0.57	0.76	12.3	0.59	0.74	12.1	0.35	0.70	14.6	0.33	0.73	14.8	0.34	0.73	14.7	0.36	0.67	14.5
PART 1 ITEM 14	0.71	0.51	10.8	0.68	0.56	11.1	0.45	0.56	13.5	0.36	0.66	14.4	0.50	0.53	13.0	0.45	0.69	13.5
PART 1 ITEM 15	0.61	0.49	11.9	0.59	0.62	12.1	0.45	0.33	13.5	0.47	0.29	13.3	0.47	0.30	13.3	0.44	0.29	13.6
PART 1 ITEM 16	0.51	0.77	12.9	0.55	0.77	12.5	0.31	0.67	15.0	0.33	0.75	14.8	0.31	0.63	15.0	0.35	0.67	14.5
PART 1 ITEM 17	0.51	0.63	12.9	0.52	0.58	12.7	0.38	0.44	14.2	0.42	0.49	13.8	0.39	0.52	14.2	0.41	0.62	13.9
PART 1 ITEM 18	0.49	0.63	13.2	0.40	0.48	14.1	0.29	0.51	15.2	0.27	0.43	15.4	0.30	0.59	15.1	0.28	0.47	15.3
PART 1 ITEM 19	0.67	0.73	11.2	0.61	0.72	11.8	0.37	0.65	14.3	0.35	0.67	14.6	0.44	0.65	13.6	0.39	0.66	14.2
PART 1 ITEM 20	0.58	0.77	12.1	0.60	0.71	12.0	0.31	0.61	15.0	0.34	0.59	14.7	0.36	0.66	14.6	0.35	0.66	14.6
PART 1 ITEM 21	0.42	0.75	13.8	0.43	0.74	13.7	0.21	0.67	16.2	0.22	0.55	16.1	0.24	0.66	15.9	0.24	0.66	15.8
PART 1 ITEM 22	0.54	0.70	12.6	0.47	0.74	13.3	0.25	0.56	15.7	0.22	0.50	16.0	0.32	0.60	14.9	0.27	0.67	15.4
PART 1 ITEM 23	0.27	0.40	15.4	0.26	0.25	15.5	0.23	0.19	16.0	0.17	0.12	16.8	0.22	0.27	16.1	0.21	0.71	16.2
PART 1 ITEM 24	0.37	0.64	14.3	0.31	0.49	15.0	0.19	0.55	16.5	0.18	0.41	16.6	0.21	0.58	16.2	0.16	0.58	16.9
PART 1 ITEM 25	0.55	0.69	12.5	0.53	0.61	12.7	0.31	0.49	14.9	0.31	0.40	15.0	0.31	0.60	15.0	0.31	0.49	15.0
PART 1 ITEM 26	0.36	0.77	14.4	0.26	0.76	15.6	0.11	0.76	17.9	0.09	0.50	18.3	0.15	0.75	17.0	0.10	0.59	18.1
PART 1 ITEM 27	0.45	0.68	13.5	0.39	0.61	14.2	0.21	0.42	16.2	0.17	0.42	16.9	0.26	0.55	15.6	0.23	0.37	16.0
PART 1 ITEM 28	0.21	0.65	16.3	0.14	0.58	17.3	0.10	0.11	18.2	0.14	0.06	17.3	0.14	0.31	17.2	0.12	-0.03	17.7
PART 2 ITEM 1	0.52	0.33	12.8	0.38	0.16	14.2	0.51	-0.08	12.9	0.50	-0.17	13.0	0.50	-0.02	13.0	0.46	-0.13	13.4
PART 2 ITEM 2	0.70	0.75	10.8	0.67	0.72	11.3	0.43	0.65	13.7	0.40	0.68	14.1	0.49	0.63	13.1	0.43	0.73	13.7
PART 2 ITEM 3	0.58	0.55	12.2	0.60	0.56	12.0	0.46	0.33	13.4	0.47	0.38	13.3	0.49	0.27	13.1	0.48	0.27	13.2
PART 2 ITEM 4	0.76	0.52	10.2	0.79	0.38	9.7	0.66	0.37	11.4	0.70	0.36	11.0	0.67	0.60	11.3	0.73	0.33	10.6
PART 2 ITEM 5	0.60	0.86	11.9	0.61	0.80	11.9	0.26	0.78	15.5	0.25	0.80	15.7	0.30	0.86	15.1	0.32	0.82	14.9
PART 2 ITEM 6	0.31	0.57	15.0	0.23	0.55	15.9	0.18	0.39	16.7	0.16	0.33	17.0	0.20	0.65	16.3	0.17	0.68	16.8
PART 2 ITEM 7	0.32	0.55	14.9	0.32	0.46	14.9	0.17	0.63	16.9	0.16	0.51	17.0	0.21	0.46	16.3	0.19	0.61	16.5
PART 2 ITEM 8	0.57	0.66	12.3	0.54	0.66	12.6	0.33	0.50	14.7	0.34	0.49	14.6	0.39	0.65	14.2	0.39	0.47	14.2
PART 2 ITEM 9	0.28	0.37	15.4	0.21	0.30	16.2	0.20	0.15	16.4	0.15	0.13	17.2	0.22	0.17	16.1	0.16	0.06	16.9
PART 2 ITEM 10	0.39	0.39	14.1	0.35	0.33	14.5	0.28	0.24	15.3	0.27	0.16	15.4	0.30	0.31	15.1	0.27	0.23	15.5
MEAN	0.57	0.62	12.2	0.54	0.57	12.6	0.39	0.49	14.3	0.37	0.45	14.5	0.40	0.51	14.1	0.39	0.47	14.2
S.D.	0.17	0.13	1.9	0.19	0.16	2.1	0.17	0.19	1.9	0.17	0.21	2.0	0.16	0.17	1.7	0.17	0.21	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	17.4	11.0	14.9	10.9	7.1	8.2	6.5	7.7	8.0	9.1	7.4	9.2
# RIGHT	21.6	9.4	20.4	7.7	14.3	6.4	13.9	6.0	15.2	7.0	14.6	6.3
# WRONG	15.5	9.2	16.6	7.5	21.5	6.7	22.2	6.4	21.6	7.1	21.6	6.9
# OMITS	0.4	1.5	0.6	1.9	0.8	2.0	0.9	2.1	0.5	1.5	0.7	1.9
# NOT REACHED P1	0.2	1.4	0.2	1.4	0.7	3.0	0.5	2.5	0.5	2.5	0.6	2.5
# NOT REACHED P2	0.3	1.5	0.3	1.4	0.6	2.2	0.5	2.0	0.4	1.6	0.4	1.7

HSB 1982 SENIORS
SCIENCE

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.87	0.72	8.5	0.86	0.63	8.7	0.87	0.67	8.6
ITEM 2	0.78	0.42	9.9	0.78	0.50	9.9	0.78	0.46	9.9
ITEM 3	0.73	0.72	10.6	0.74	0.65	10.5	0.73	0.68	10.5
ITEM 4	0.76	0.65	10.2	0.66	0.56	11.3	0.71	0.61	10.8
ITEM 5	0.83	0.83	9.2	0.74	0.75	10.5	0.78	0.79	9.9
ITEM 6	0.88	0.59	8.2	0.86	0.54	8.7	0.87	0.56	8.5
ITEM 7	0.56	0.57	12.4	0.58	0.57	12.2	0.57	0.56	12.3
ITEM 8	0.80	0.80	9.6	0.72	0.66	10.7	0.76	0.73	10.2
ITEM 9	0.73	0.75	10.6	0.61	0.74	11.9	0.67	0.74	11.3
ITEM 10	0.74	0.40	10.4	0.67	0.41	11.2	0.70	0.42	10.8
ITEM 11	0.69	0.66	11.1	0.51	0.57	12.9	0.59	0.62	12.1
ITEM 12	0.53	0.69	12.7	0.49	0.67	13.1	0.51	0.68	12.9
ITEM 13	0.59	0.73	12.0	0.60	0.67	12.0	0.60	0.70	12.0
ITEM 14	0.27	0.49	15.5	0.22	0.44	16.1	0.24	0.47	15.8
ITEM 15	0.51	0.51	12.9	0.37	0.29	14.4	0.44	0.42	13.6
ITEM 16	0.38	0.52	14.2	0.40	0.45	14.0	0.39	0.48	14.1
ITEM 17	0.57	0.69	12.8	0.48	0.65	13.2	0.50	0.67	13.0
ITEM 18	0.36	0.43	14.4	0.34	0.43	14.6	0.35	0.43	14.5
ITEM 19	0.34	0.54	14.7	0.28	0.41	15.3	0.31	0.48	15.0
ITEM 20	0.22	0.20	16.1	0.21	0.17	16.3	0.21	0.19	16.2
MEAN	0.60	0.60	11.8	0.55	0.54	12.4	0.58	0.57	12.1
S.D.	0.20	0.15	2.3	0.20	0.15	2.2	0.20	0.14	2.2

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	10.1	4.8	8.9	4.6	9.5	4.8
# RIGHT	11.9	4.0	11.0	3.8	11.4	3.9
# WRONG	7.4	3.8	8.3	3.7	7.9	3.8
# OMITS	0.2	0.8	0.3	1.0	0.3	0.9
# NOT REACHED	0.5	1.5	0.4	1.3	0.4	1.4

COEFFICIENT ALPHA	0.78	0.74	0.76
SAMPLE SIZE	12525	12842	25367
POPULATION ESTIMATE	1829260	1835340	3664600

E11

HSB 1982 SENIORS
SCIENCE

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.90	0.67	7.9	0.79	0.58	9.8	0.76	0.61	10.2	0.87	0.67	8.6
ITEM 2	0.87	0.39	9.4	0.66	0.48	11.3	0.68	0.48	11.1	0.78	0.46	9.9
ITEM 3	0.78	0.67	9.9	0.59	0.59	12.1	0.57	0.64	12.3	0.73	0.68	10.5
ITEM 4	0.75	0.60	10.3	0.55	0.53	12.5	0.60	0.53	12.0	0.71	0.61	10.8
ITEM 5	0.86	0.74	8.7	0.49	0.70	13.1	0.61	0.72	11.9	0.78	0.79	9.9
ITEM 6	0.90	0.52	7.9	0.78	0.45	9.9	0.79	0.57	9.8	0.87	0.56	8.5
ITEM 7	0.63	0.52	11.6	0.34	0.54	14.7	0.45	0.48	13.5	0.57	0.56	12.3
ITEM 8	0.82	0.70	9.4	0.56	0.63	12.4	0.62	0.68	11.8	0.76	0.73	10.2
ITEM 9	0.76	0.70	10.2	0.32	0.65	14.9	0.47	0.65	13.3	0.67	0.74	11.3
ITEM 10	0.74	0.34	10.5	0.57	0.43	12.2	0.64	0.45	11.5	0.70	0.42	10.8
ITEM 11	0.65	0.60	11.5	0.38	0.52	14.2	0.47	0.59	13.3	0.59	0.62	12.1
ITEM 12	0.56	0.68	12.4	0.35	0.53	14.6	0.36	0.58	14.5	0.51	0.68	12.9
ITEM 13	0.67	0.68	11.3	0.38	0.57	14.2	0.42	0.62	13.8	0.60	0.70	12.0
ITEM 14	0.27	0.46	15.4	0.14	0.42	17.3	0.18	0.39	16.7	0.24	0.47	15.8
ITEM 15	0.45	0.47	13.5	0.39	0.25	14.1	0.38	0.37	14.2	0.44	0.42	13.6
ITEM 16	0.43	0.46	13.7	0.28	0.42	15.4	0.27	0.41	15.4	0.39	0.48	14.1
ITEM 17	0.56	0.64	12.4	0.30	0.63	15.1	0.32	0.69	14.9	0.50	0.67	13.0
ITEM 18	0.38	0.44	14.2	0.25	0.33	15.7	0.28	0.32	15.4	0.35	0.43	14.5
ITEM 19	0.33	0.51	14.7	0.20	0.23	16.4	0.22	0.33	16.1	0.31	0.48	15.0
ITEM 20	0.21	0.22	16.2	0.22	0.20	16.0	0.21	0.14	16.2	0.21	0.19	16.7
MEAN	0.62	0.55	11.5	0.43	0.48	13.8	0.46	0.51	13.4	0.58	0.57	12.1
S.D.	0.21	0.14	2.4	0.18	0.14	2.0	0.18	0.15	2.0	0.20	0.14	2.2

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	10.6	4.3	5.7	4.2	6.6	4.5	9.5	4.8
# RIGHT	12.4	3.5	8.3	3.4	9.1	3.7	11.4	3.9
# WRONG	7.1	3.4	10.3	3.7	9.9	3.8	7.9	3.8
# OMITS	0.2	0.8	0.4	1.1	0.3	1.2	0.3	0.9
# NOT REACHED	0.3	1.7	1.0	2.1	0.6	1.7	0.4	1.4

COEFFICIENT ALPHA	0.73	0.67	0.72	0.76
SAMPLE SIZE	16757	3356	4537	25367
POPULATION ESTIMATE	2655872	444157	460072	3664600

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                                                                                      HSB 1982 SE
                                                                                        SCIENCE

                          WHITE MALE                WHITE FEMALE              BLACK MA
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                     P+    RBIS   DELTA        P+    RBIS   DELTA        P+    RBIS
ITEM  1            0.90   0.74    7.8        0.89   0.61    8.0        0.82   0.59
ITEM  2            0.81   0.37    9.5        0.82   0.43    9.3        0.71   0.44
ITEM  3            0.73   0.72    9.9        0.79   0.63    9.8        0.60   0.63
ITEM  4            0.80   0.65    9.6        0.71   0.54   10.9        0.61   0.57
ITEM  5            0.90   0.79    7.8        0.82   0.70    9.4        0.55   0.73
ITEM  6            0.91   0.53    7.6        0.89   0.52    8.2        0.80   0.49
ITEM  7            0.62   0.54   11.8        0.65   0.52   11.5        0.34   0.54
ITEM  8            0.85   0.79    8.8        0.78   0.63    9.9        0.61   0.72
ITEM  9            0.82   0.69    9.3        0.70   0.69   10.9        0.39   0.68
ITEM 10            0.77   0.35   10.1        0.71   0.36   10.8        0.63   0.42
ITEM 11            0.74   0.63   10.4        0.56   0.55   12.4        0.46   0.59
ITEM 12            0.59   0.69   12.1        0.54   0.68   12.6        0.36   0.61
ITEM 13            0.67   0.73   11.3        0.67   0.65   11.3        0.39   0.62
ITEM 14            0.29   0.47   15.1        0.24   0.43   15.9        0.16   0.43
ITEM 15            0.54   0.54   12.6        0.36   0.35   14.4        0.41   0.35
ITEM 16            0.42   0.52   13.8        0.44   0.43   13.6        0.29   0.50
ITEM 17            0.59   0.66   12.1        0.54   0.61   12.6        0.33   0.71
ITEM 18            0.39   0.46   14.2        0.37   0.43   14.3        0.27   0.29
ITEM 19            0.38   0.56   14.3        0.29   0.43   15.2        0.19   0.20
ITEM 20            0.22   0.23   16.1        0.20   0.20   16.3        0.22   0.22

    MEAN           0.65   0.58   11.2        0.60   0.52   11.9        0.46   0.52
    S.D.           0.21   0.15    2.5        0.21   0.13    2.4        0.19   0.16

SUMMARY:
                     MEAN     S.D.             MEAN     S.D.             MEAN     S
FORMULA SCORE        11.2     4.4              10.0     4.2               6.4     4
# RIGHT              12.9     3.6              11.9     3.4               8.8     3
# WRONG               6.6     3.4               7.6     3.4               9.7     3
# OMITS               0.2     0.8               0.3     0.9               0.3     0
# NOT REACHED         0.3     1.3               0.2     1.0               1.1     2

COEFFICIENT ALPHA          0.75                     0.70                     0.73
SAMPLE SIZE                8264                     4493                     1562
POPULATION ESTIMATE     1397705                  1348166                   209327
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NIORS

ALE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
9.4	0.76	0.57	10.1	0.76	0.65	10.2	0.76	0.57	10.2
10.8	0.62	0.52	11.8	0.69	0.47	11.1	0.69	0.48	11.1
12.0	0.59	0.56	12.1	0.56	0.65	12.4	0.58	0.65	12.2
11.9	0.51	0.47	12.9	0.63	0.55	11.6	0.55	0.48	12.5
12.5	0.44	0.67	13.6	0.67	0.76	11.2	0.54	0.67	12.6
9.6	0.76	0.41	10.1	0.80	0.61	9.6	0.77	0.53	10.0
14.6	0.33	0.55	14.8	0.45	0.49	13.5	0.44	0.46	13.6
11.9	0.51	0.52	12.9	0.66	0.70	11.4	0.57	0.64	12.3
14.1	0.26	0.58	15.6	0.54	0.64	12.6	0.39	0.66	14.1
11.6	0.52	0.41	12.8	0.67	0.45	11.2	0.60	0.44	11.9
13.4	0.31	0.42	15.0	0.53	0.65	12.7	0.39	0.50	14.1
14.4	0.34	0.44	14.7	0.37	0.54	14.4	0.35	0.63	14.6
14.1	0.37	0.54	14.3	0.39	0.63	14.1	0.45	0.62	13.5
16.9	0.13	0.39	17.6	0.19	0.39	16.6	0.17	0.38	16.8
14.0	0.37	0.14	14.3	0.41	0.43	13.9	0.34	0.27	14.7
15.2	0.27	0.34	15.5	0.25	0.42	15.7	0.30	0.41	15.2
14.8	0.28	0.53	15.4	0.33	0.67	14.7	0.30	0.71	15.1
15.4	0.23	0.36	15.9	0.29	0.29	15.2	0.26	0.35	15.6
16.5	0.20	0.27	16.3	0.21	0.41	16.3	0.24	0.26	15.8
16.0	0.23	0.19	16.0	0.21	0.15	16.3	0.21	0.12	16.2
13.5	0.40	0.44	14.1	0.48	0.53	13.2	0.44	0.49	13.6
2.1	0.18	0.13	2.0	0.19	0.15	2.1	0.18	0.16	1.9

.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
.5	5.1	3.8	7.0	4.6	6.2	4.4
.7	7.8	3.1	9.4	3.8	8.7	3.6
.8	10.8	3.5	9.6	3.8	10.3	3.6
.9	0.5	1.3	0.3	1.0	0.3	1.3
.3	0.9	2.0	0.6	1.8	0.6	1.7

0.59	0.74	0.69
1794	2326	2211
234830	252812	207260

E13

HSB 1982 SENIORS
WRITING

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.69	0.71	11.0	0.83	0.74	9.3	0.76	0.74	10.2
ITEM 2	0.51	0.69	12.9	0.68	0.74	11.1	0.59	0.73	12.0
ITEM 3	0.69	0.71	11.0	0.86	0.75	8.7	0.77	0.75	10.0
ITEM 4	0.56	0.65	12.4	0.67	0.68	11.2	0.62	0.68	11.8
ITEM 5	0.35	0.49	14.5	0.49	0.57	13.1	0.42	0.54	13.8
ITEM 6	0.73	0.60	10.5	0.80	0.57	9.6	0.77	0.60	10.1
ITEM 7	0.64	0.62	11.6	0.73	0.63	10.5	0.69	0.63	11.1
ITEM 8	0.63	0.46	11.6	0.71	0.41	10.8	0.67	0.44	11.3
ITEM 9	0.82	0.59	9.3	0.87	0.53	8.5	0.85	0.57	8.9
ITEM 10	0.57	0.79	12.3	0.72	0.71	10.7	0.65	0.72	11.5
ITEM 11	0.73	0.81	10.5	0.84	0.85	9.1	0.78	0.84	9.9
ITEM 12	0.37	0.60	14.3	0.47	0.60	13.3	0.42	0.61	13.8
ITEM 13	0.52	0.69	12.8	0.61	0.73	11.9	0.57	0.71	12.3
ITEM 14	0.69	0.79	11.1	0.80	0.81	9.6	0.74	0.81	10.4
ITEM 15	0.63	0.71	11.7	0.75	0.78	10.3	0.69	0.75	11.0
ITEM 16	0.73	0.74	10.6	0.82	0.77	9.3	0.77	0.77	10.0
ITEM 17	0.72	0.71	10.6	0.82	0.72	9.3	0.78	0.73	10.0
MEAN	0.62	0.66	11.7	0.73	0.68	10.4	0.68	0.68	11.1
S.D.	0.12	0.09	1.3	0.12	0.11	1.4	0.12	0.10	1.3

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	8.2	5.4	10.8	4.8	9.5	5.3
# RIGHT	10.2	4.2	12.2	3.8	11.2	4.1
# WRONG	6.0	3.9	4.3	3.4	5.1	3.8
# OMITS	0.2	0.8	0.2	0.6	0.2	0.7
# NOT REACHED	0.5	1.6	0.4	1.4	0.4	1.5

COEFFICIENT ALPHA	0.82	0.81	0.83
SAMPLE SIZE	12429	12742	25171
POPULATION ESTIMATE	1813472	1821681	3635152

E14

HSB 1982 SENIORS
WRITING

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.80	0.75	9.6	0.62	0.66	11.7	0.63	0.68	11.7	0.76	0.74	10.2
ITEM 2	0.66	0.72	11.4	0.39	0.66	14.1	0.44	0.64	13.6	0.59	0.73	12.0
ITEM 3	0.81	0.78	9.5	0.68	0.63	11.1	0.66	0.64	11.4	0.77	0.75	10.0
ITEM 4	0.67	0.68	11.3	0.48	0.60	13.2	0.47	0.58	13.3	0.62	0.68	11.8
ITEM 5	0.46	0.57	13.4	0.32	0.32	14.9	0.29	0.45	15.3	0.42	0.54	13.8
ITEM 6	0.80	0.62	9.6	0.68	0.45	11.1	0.66	0.54	11.3	0.77	0.60	10.1
ITEM 7	0.73	0.64	10.6	0.58	0.56	12.2	0.56	0.56	12.4	0.69	0.63	11.1
ITEM 8	0.71	0.40	10.8	0.54	0.42	12.6	0.59	0.47	12.0	0.67	0.44	11.3
ITEM 9	0.87	0.53	8.4	0.76	0.58	10.1	0.75	0.57	10.3	0.85	0.57	8.9
ITEM 10	0.70	0.72	10.9	0.51	0.61	12.9	0.48	0.65	13.2	0.65	0.72	11.5
ITEM 11	0.83	0.85	9.1	0.65	0.73	11.5	0.62	0.76	11.8	0.78	0.84	9.9
ITEM 12	0.46	0.61	13.4	0.33	0.54	14.7	0.31	0.61	15.0	0.42	0.61	13.8
ITEM 13	0.63	0.73	11.7	0.37	0.51	14.3	0.38	0.59	14.2	0.57	0.71	12.3
ITEM 14	0.80	0.82	9.6	0.58	0.67	12.2	0.58	0.74	12.2	0.74	0.81	10.4
ITEM 15	0.75	0.75	10.3	0.50	0.65	13.0	0.52	0.67	12.8	0.69	0.75	11.0
ITEM 16	0.82	0.77	9.4	0.67	0.65	11.8	0.62	0.70	11.8	0.77	0.77	10.0
ITEM 17	0.82	0.72	9.3	0.61	0.62	11.9	0.63	0.65	11.6	0.78	0.73	10.0
MEAN	0.72	0.68	10.5	0.54	0.58	12.6	0.54	0.62	12.6	0.69	0.68	11.1
S.D.	0.12	0.11	1.4	0.13	0.10	1.3	0.13	0.08	1.3	0.12	0.10	1.3

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	10.6	4.9	6.3	4.8	6.4	5.2	9.5	5.3
# RIGHT	12.1	3.8	8.6	3.8	8.8	4.0	11.2	4.1
# WRONG	4.5	3.5	6.9	3.6	7.3	3.9	5.1	3.8
# OMITS	0.2	0.6	0.4	1.1	0.2	0.7	0.2	0.7
# NOT REACHED	0.3	1.2	1.2	2.3	0.7	2.0	0.4	1.5
COEFFICIENT ALPHA	0.81		0.76		0.80		0.82	
SAMPLE SIZE	16642		3312		4504		25171	
POPULATION ESTIMATE	2637343		438530		456389		3635152	

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                                                                  HSB 1982 S
                                                                     WRITING

                       WHITE MALE            WHITE FEMALE            BLACK
                    -----------------     -----------------     ----------
                    P+    RBIS   DELTA    P+    RBIS   DELTA    P+    RBIS
ITEM  1            0.74   0.72   10.4    0.87   0.73    9.6    0.54   0.63
ITEM  2            0.56   0.68   12.4    0.75   0.72   10.3    0.33   0.62
ITEM  3            0.73   0.74   10.6    0.89   0.75    8.0    0.50   0.54
ITEM  4            0.61   0.64   11.9    0.72   0.69   10.6    0.44   0.60
ITEM  5            0.39   0.53   14.3    0.54   0.57   12.6    0.31   0.26
ITEM  6            0.77   0.63   10.1    0.84   0.59    9.1    0.65   0.48
ITEM  7            0.69   0.63   11.2    0.78   0.61    9.9    0.55   0.54
ITEM  8            0.67   0.47   11.2    0.74   0.35   10.4    0.51   0.46
ITEM  9            0.86   0.57    8.7    0.89   0.46    8.1    0.72   0.57
ITEM 10            0.62   0.70   11.7    0.77   0.71   10.0    0.44   0.62
ITEM 11            0.78   0.82    9.9    0.88   0.85    8.3    0.59   0.71
ITEM 12            0.40   0.60   14.0    0.50   0.61   13.0    0.29   0.54
ITEM 13            0.58   0.72   12.2    0.67   0.75   11.2    0.35   0.49
ITEM 14            0.75   0.80   10.3    0.85   0.81    8.9    0.51   0.67
ITEM 15            0.69   0.70   11.1    0.81   0.77    9.6    0.46   0.69
ITEM 16            0.77   0.75   10.0    0.86   0.76    8.6    0.59   0.67
ITEM 17            0.78   0.69   10.0    0.87   0.71    9.6    0.54   0.61

   MEAN            0.67   0.67   11.2    0.78   0.67    9.7    0.49   0.56
   S.D.            0.13   0.10    1.4    0.11   0.12    1.4    0.12   0.10

SUMMARY:

                     MEAN     S.D.         MEAN     S.D.         MEAN
FORMULA SCORE         9.3      5.2         11.9      4.2          5.2
# RIGHT              11.1      4.0         13.1      3.3          7.7
# WRONG               5.3      3.7          3.6      3.0          7.5
# OMITS               0.2      0.7          0.1      0.5          0.4
# NOT REACHED         0.4      1.3          0.2      1.0          1.3

COEFFICIENT ALPHA         0.82                 0.78                 0.74
SAMPLE SIZE               9207                 8435                 1561
POPULATION ESTIMATE    1297973              1339370               206302
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ENIORS
S

ALE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
12.6	0.70	0.66	11.0	0.57	0.65	12.3	0.70	0.69	10.9
14.8	0.45	0.68	13.5	0.39	0.63	14.1	0.51	0.63	12.9
12.1	0.76	0.68	10.2	0.58	0.60	12.2	0.75	0.66	10.4
13.6	0.51	0.60	12.9	0.42	0.59	13.8	0.53	0.55	12.7
15.0	0.33	0.37	14.8	0.26	0.38	15.6	0.32	0.52	14.9
11.4	0.70	0.41	10.9	0.62	0.53	11.7	0.71	0.52	10.8
12.5	0.60	0.57	12.0	0.52	0.53	12.8	0.61	0.58	11.9
12.9	0.56	0.39	12.4	0.55	0.44	12.4	0.64	0.47	11.5
10.7	0.81	0.56	9.6	0.73	0.57	10.6	0.78	0.58	9.9
13.6	0.57	0.59	12.2	0.41	0.63	13.9	0.55	0.65	12.5
12.1	0.70	0.73	10.9	0.57	0.75	12.3	0.68	0.77	11.1
15.2	0.37	0.53	14.3	0.27	0.59	15.4	0.35	0.63	14.6
14.5	0.38	0.55	14.2	0.34	0.56	14.6	0.42	0.61	13.8
12.9	0.64	0.66	11.6	0.52	0.73	12.8	0.64	0.74	11.6
13.4	0.53	0.68	12.7	0.46	0.65	13.4	0.60	0.66	12.0
12.1	0.65	0.64	11.5	0.57	0.69	12.3	0.68	0.69	11.1
12.6	0.66	0.60	11.3	0.58	0.63	12.2	0.70	0.63	10.9
13.1	0.58	0.58	12.1	0.49	0.60	13.1	0.60	0.62	12.0
1.2	0.14	0.10	1.4	0.12	0.09	1.3	0.13	0.08	1.4

.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
.6	7.2	4.7	5.4	5.0	7.6	5.1
.7	9.3	3.8	8.0	3.9	9.7	4.0
.6	6.4	3.5	8.0	3.9	6.3	3.8
.3	0.3	0.8	0.3	0.8	0.2	0.7
.5	1.0	2.1	0.7	2.0	0.7	1.9

0.75	0.78	0.80
1771	2312	2192
232228	251292	205097

E16

HSB 1982 SENIORS
CIVICS EDUCATION

	MALE			FEMALE			TOTAL		
	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.95	0.69	6.4	0.97	0.63	5.6	0.96	0.66	6.1
ITEM 2	0.63	0.60	11.7	0.68	0.60	11.1	0.65	0.60	11.4
ITEM 3	0.69	0.65	11.1	0.67	0.63	11.3	0.67	0.64	11.2
ITEM 4	0.72	0.72	10.7	0.72	0.67	10.7	0.72	0.69	10.7
ITEM 5	0.71	0.71	10.7	0.69	0.64	11.0	0.70	0.68	10.9
ITEM 6	0.49	0.68	13.1	0.44	0.64	13.6	0.47	0.65	13.3
ITEM 7	0.54	0.52	12.6	0.63	0.54	11.6	0.59	0.53	12.1
ITEM 8	0.64	0.61	11.5	0.72	0.60	10.7	0.68	0.60	11.1
ITEM 9	0.67	0.71	11.2	0.71	0.72	10.7	0.69	0.72	11.0
ITEM 10	0.46	0.50	13.4	0.48	0.53	13.2	0.47	0.52	13.3
MEAN	0.65	0.64	11.2	0.67	0.62	11.0	0.66	0.63	11.1
S.D.	0.13	0.08	1.8	0.14	0.05	2.0	0.13	0.06	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	5.3	2.9	5.6	2.7	5.4	2.8
# RIGHT	6.4	2.2	6.7	2.1	6.5	2.1
# WRONG	3.4	2.1	3.2	2.0	3.3	2.1
# OMITS	0.0	0.3	0.1	0.3	0.1	0.3
# NOT REACHED	0.2	0.7	0.1	0.6	0.1	0.6

COEFFICIENT ALPHA	0.62	0.58	0.60
SAMPLE SIZE	12382	12684	25066
POPULATION ESTIMATE	1804660	1811677	3616337

E17

HSB 1982 SENIORS
CIVICS EDUCATION

	WHITE			BLACK			HISPANIC			TOTAL		
	P+	PBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
ITEM 1	0.97	0.63	5.4	0.91	0.64	7.6	0.92	0.61	7.3	0.96	0.66	6.1
ITEM 2	0.68	0.60	11.1	0.58	0.58	12.2	0.57	0.60	12.3	0.65	0.60	11.4
ITEM 3	0.71	0.64	10.8	0.57	0.56	12.3	0.55	0.63	12.5	0.67	0.64	11.2
ITEM 4	0.75	0.69	10.3	0.64	0.61	11.5	0.60	0.68	12.0	0.72	0.69	10.7
ITEM 5	0.75	0.69	10.4	0.56	0.56	12.4	0.59	0.62	12.1	0.70	0.68	10.9
ITEM 6	0.51	0.66	12.9	0.34	0.54	14.6	0.33	0.56	14.8	0.47	0.65	13.3
ITEM 7	0.61	0.53	11.8	0.53	0.51	12.7	0.51	0.47	12.9	0.59	0.53	12.1
ITEM 8	0.71	0.60	10.7	0.58	0.56	12.2	0.60	0.57	12.0	0.68	0.60	11.1
ITEM 9	0.75	0.72	10.4	0.55	0.63	12.5	0.54	0.63	12.6	0.69	0.72	11.0
ITEM 10	0.49	0.52	13.1	0.41	0.51	13.9	0.39	0.42	14.1	0.47	0.52	13.3
MEAN	0.69	0.63	10.7	0.57	0.57	12.2	0.56	0.59	12.2	0.66	0.63	11.1
S.D.	0.13	0.06	2.0	0.14	0.04	1.7	0.15	0.07	1.9	0.13	0.06	1.9

SUMMARY:

	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
FORMULA SCORE	5.9	2.7	4.2	2.7	4.1	2.8	5.4	2.8
# RIGHT	6.9	2.1	5.6	2.1	5.5	2.1	6.5	2.1
# WRONG	3.0	2.0	4.1	2.1	4.2	2.1	3.3	2.1
# OMITS	0.0	0.3	0.1	0.4	0.1	0.3	0.1	0.3
# NOT REACHED	0.1	0.5	0.3	0.9	0.2	0.8	0.1	0.6
COEFFICIENT ALPHA	0.59		0.53		0.55		0.60	
SAMPLE SIZE	16576		3295		4484		25066	
POPULATION ESTIMATE	2626725		436476		450832		3616337	

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                                                              HSB 1982 S
                                                             CIVICS EDUC

                        WHITE MALE           WHITE FEMALE          BLACK
                   ------------------   ------------------   ----------
                   P+    RBIS   DELTA   P+    RBIS   DELTA   P+    RBIS
ITEM  1           0.97   0.65    5.6   0.98   0.60    5.1   0.90   0.63
ITEM  2           0.65   0.61   11.5   0.71   0.59   10.8   0.58   0.58
ITEM  3           0.71   0.66   10.7   0.71   0.62   10.8   0.59   0.56
ITEM  4           0.75   0.72   10.3   0.75   0.67   10.3   0.64   0.69
ITEM  5           0.75   0.73   10.2   0.74   0.65   10.5   0.60   0.61
ITEM  6           0.54   0.70   12.6   0.48   0.64   13.2   0.37   0.52
ITEM  7           0.57   0.52   12.3   0.66   0.54   11.4   0.49   0.51
ITEM  8           0.67   0.61   11.2   0.75   0.58   10.2   0.54   0.56
ITEM  9           0.73   0.72   10.6   0.76   0.73   10.1   0.53   0.63
ITEM 10           0.48   0.51   13.2   0.50   0.54   13.0   0.42   0.50

   MEAN           0.68   0.64   10.8   0.70   0.62   10.5   0.57   0.58
   S.D.           0.13   0.08    2.0   0.13   0.05    2.1   0.14   0.06

SUMMARY:

                       MEAN     S.D.         MEAN     S.D.         MEAN
FORMULA SCORE          5.7      2.3          6.0      2.6          4.1
# RIGHT                6.8      2.1          7.0      2.0          5.5
# WRONG                3.1      2.1          2.9      1.9          4.1
# OMITS                0.0      0.3          0.1      0.3          0.1
# NOT REACHED          0.1      0.6          0.1      0.5          0.3

COEFFICIENT ALPHA          0.61                 0.56                 0.5
SAMPLE SIZE                9172                 8404                 153
POPULATION ESTIMATE     1291606              1335112              20601
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SENIORS
CATION

MALE	BLACK FEMALE			HISPANIC MALE			HISPANIC FEMALE		
DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA	P+	RBIS	DELTA
7.9	0.92	0.66	7.3	0.90	0.63	7.9	0.96	0.55	6.1
12.2	0.58	0.59	12.2	0.54	0.58	12.6	0.61	0.61	11.9
12.1	0.55	0.56	12.5	0.55	0.63	12.5	0.55	0.63	12.5
11.6	0.65	0.53	11.5	0.60	0.67	12.0	0.60	0.69	12.0
12.0	0.54	0.52	12.6	0.59	0.64	12.1	0.59	0.61	12.1
14.4	0.32	0.56	14.8	0.35	0.57	14.6	0.31	0.56	15.0
13.1	0.57	0.52	12.3	0.46	0.44	13.4	0.58	0.50	12.2
12.6	0.61	0.56	11.9	0.57	0.55	12.3	0.63	0.58	11.6
12.7	0.56	0.63	12.4	0.53	0.62	12.7	0.56	0.63	12.4
13.8	0.41	0.52	13.9	0.37	0.39	14.4	0.42	0.45	13.8
12.2	0.57	0.56	12.2	0.55	0.57	12.4	0.58	0.59	12.0
1.6	0.15	0.05	1.9	0.14	0.09	1.7	0.16	0.07	2.2

S.D.	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
2.8	4.2	2.7	3.9	2.8	4.4	2.7
2.2	5.6	2.0	5.4	2.1	5.7	2.1
2.1	4.1	2.0	4.4	2.1	4.1	2.1
0.4	0.1	0.3	0.1	0.3	0.0	0.3
1.0	0.2	0.8	0.2	0.9	0.2	0.8
5	0.50		0.54		0.55	
4	1757		2302		2182	
0	230466		249237		201595	

APPENDIX F

IRT Item Parameters

F1 Item Parameters for Vocabulary Test

F2 Item Parameters for Reading Test

F3 Item Parameters for Mathematics Test

F4 Item Parameters for Science Test

F5 Item Parameters for Writing Test

F1

ITEM PARAMETERS FOR VOCABULARY TEST

ITEM NUMBER			"A"	"B"	"C"
NLS 1972	HSB 1980	HSB 1982	ITEM DISCRIMINATION	ITEM DIFFICULTY	GUESSING PARAMETER
1	1	5	1.1040	-1.6775	0.1088
3	3	7	1.6623	-0.5267	0.2047
4	4	10	1.4060	-0.0447	0.2818
5	5	11	1.5896	-0.6255	0.3143
7	7	13	1.7168	0.2290	0.2100
8	8	15	1.1963	1.1996	0.1894
12	12	18	1.4128	1.0050	0.1649
13	13	19	1.7500	1.8910	0.2921
15	15	21	1.0159	0.5724	0.1243
2	2		1.5207	0.4322	0.1489
6	6		0.9061	0.3904	0.2105
9	9		1.0773	0.7105	0.2459
10	10		1.2463	0.3345	0.1581
11	11		1.6054	0.9721	0.1705
14	14		0.1800	1.2566	0.0214
		1	1.3079	-1.2191	0.1088
		2	1.4812	-1.8990	0.1088
		3	1.3062	-1.1016	0.1088
		4	1.0721	-1.4115	0.1088
		6	1.2306	-0.1428	0.1815
		8	1.3764	-1.2464	0.1088
		9	1.7421	-0.6824	0.2127
		12	0.6828	-1.3722	0.1088
		14	1.6940	0.5846	0.1208
		16	0.5327	-0.4313	0.1088
		17	0.9890	0.3373	0.1349
		20	1.7500	1.4209	0.1743
	16		0.5852	-2.3193	0.1088
	17		0.5680	-0.4781	0.1088
	18		1.7500	-0.3038	0.0635
	19		0.6829	-0.2307	0.1088
	20		1.6096	0.2853	0.1539
	21		1.2016	2.5332	0.2024
	22		1.2794	0.8836	0.2601
	23		0.9066	-0.1212	0.1067
	24		0.8137	1.3922	0.3167
	25		0.5170	1.0191	0.0779
	26		1.7500	0.9889	0.2430
	27		1.7500	1.0682	0.2015

F2

ITEM PARAMETERS FOR READING TEST

ITEM NUMBER			"A" ITEM DISCRIMINATION	"B" ITEM DIFFICULTY	"C" GUESSING PARAMETER
NLS 1972	HSB 1980	HSB 1982			
6	6	14	1.1698	-0.6847	0.1048
7	7	15	0.8564	0.2549	0.0469
8	8	16	1.4939	0.1951	0.1877
9	9	17	0.9988	0.6861	0.1962
10	10	10	1.2763	0.3707	0.2667
11	11	11	0.8511	0.8157	0.1709
12	12	12	0.7508	-1.4490	0.1048
13	13	13	1.3581	-0.0434	0.1170
1	1		0.8239	-1.2432	0.1048
2	2		1.4211	0.0727	0.2751
3	3		0.5582	-2.3112	0.1048
4	4		0.7583	-0.5175	0.1048
5	5		0.7529	-0.6394	0.1048
14	14		0.6847	1.1942	0.0616
15	15		1.2841	1.5813	0.1045
16	16		0.9769	0.3640	0.1126
17	17		0.5672	1.3461	0.1643
18	18		1.0555	-0.1353	0.2842
19	19		1.4063	1.1597	0.2805
20	20		1.5000	0.7802	0.2261
		1	0.9985	-2.4400	0.1048
		2	0.8092	-1.7381	0.1048
		3	0.9177	-1.1389	0.1048
		5	1.0444	-0.5677	0.1048
		6	1.0296	-0.2096	0.1642
		7	1.1336	0.4778	0.2362
		8	1.5000	0.2363	0.1607
		9	1.2686	1.6799	0.1104
		18	1.5000	0.4383	0.1391
		19	1.5000	1.6607	0.1766
		20	0.9933	0.1632	0.1936

F3

ITEM PARAMETERS FOR MATHEMATICS TEST

ITEM NUMBER NLS 1972	 HSB 1980	 HSB 1982	"A" ITEM DISCRIMINATION	"B" ITEM DIFFICULTY	"C" GUESSING PARAMETER
2	2	2	0.3468	-2.1432	0.1640
3	3	3	0.6282	-1.0846	0.1640
4	4	4	0.5806	-1.1984	0.1640
5	5	5	1.7031	-0.4617	0.1134
10	10	10	1.3073	-0.0352	0.1688
12	12	12	1.0576	-0.4201	0.1709
13	13	13	1.1327	-0.2033	0.0512
16	16	16	1.5999	0.1096	0.1173
17	17	17	1.1741	0.2752	0.2328
20	20	20	1.2187	-0.0838	0.0997
21	21	21	1.3358	0.3765	0.0587
24	24	24	0.7733	0.6403	0.0528
	6	6	0.5848	-0.9134	0.1640
	11	11	0.8459	0.6796	0.2111
	14	14	0.7677	-0.3168	0.1640
	15	15	1.1100	0.7337	0.4049
	18	18	0.6471	0.6145	0.1065
	22	22	1.3993	0.3151	0.1402
1			0.6767	-1.3617	0.1640
6			0.8281	-0.7268	0.1640
7			1.0117	-0.6724	0.1640
8			0.9284	0.1355	0.1747
9			0.6567	-0.7121	0.1640
11			0.7237	-0.0768	0.0949
14			0.6446	-0.3706	0.1640
15			1.1395	0.6473	0.3441
18			0.6967	0.2685	0.1214
19			1.0594	0.8592	0.3758
22			0.8805	0.3845	0.1169
23			1.7043	0.8720	0.2010
25			2.0000	0.8608	0.2661
	1		0.7198	-3.3442	0.1640
	7		1.2469	-0.6133	0.1571
	8		0.3930	-3.9020	0.1640
	9		0.9105	-0.1229	0.2967
	19		1.0517	0.2407	0.3099
	23		0.2700	0.9508	0.1640
	25		2.0000	1.4548	0.3259
	26		1.4623	0.3848	0.2184
	27		2.0000	0.6837	0.1961

(CONTINUED)

ITEM PARAMETERS FOR MATHEMATICS TEST (CONTINUED)

ITEM NUMBER			"A"	"B"	"C"
NLS 1972	HSB 1980	HSB 1982	ITEM DISCRIMINATION	ITEM DIFFICULTY	GUESSING PARAMETER
	28		1.7436	-0.4650	0.2081
	29		0.3652	-2.3041	0.1640
	30		0.6303	2.1930	0.1376
	31		2.0000	0.9289	0.3011
	32		2.0000	1.3912	0.4290
		1	0.7700	-1.9465	0.1640
		7	1.7501	-0.3133	0.1654
		8	2.0000	-0.9199	0.0899
		9	0.5370	-0.6883	0.1640
		19	1.4231	-0.1776	0.1414
		23	1.6972	1.5934	0.1875
		25	0.9614	0.0693	0.1123
		26	1.5044	0.8435	0.0484
		27	1.2008	0.7088	0.1610
		28	1.7647	1.6179	0.0833
		29	2.0000	1.5011	0.4089
		30	1.3567	-0.4214	0.1003
		31	1.1021	0.4283	0.3533
		32	0.4298	-1.6453	0.1640
		33	1.6024	-0.1748	0.0416
		34	1.3552	1.1861	0.1059
		35	0.9829	1.2870	0.1397
		36	1.9607	0.3445	0.2466
		37	1.7430	1.7907	0.1859
		38	1.0464	1.5440	0.2528

F4

ITEM PARAMETERS FOR SCIENCE TEST

ITEM NUMBER	"A" ITEM DISCRIMINATION	"B" ITEM DIFFICULTY	"C" GUESSING PARAMETER
1	0.9547	-1.6738	0.1134
2	0.4115	-1.8636	0.1134
3	0.9601	-0.8709	0.1134
4	1.1322	-0.2356	0.3508
5	1.4000	-0.9345	0.0737
6	0.6145	-2.1830	0.1134
7	0.8645	0.1498	0.2147
8	1.2429	-0.8536	0.1134
9	1.4000	-0.3937	0.1296
10	0.3285	-1.3860	0.1134
11	1.2810	0.0946	0.2501
12	1.4000	0.2166	0.1744
13	1.3035	-0.0999	0.1616
14	0.9908	1.6274	0.1324
15	1.4000	1.1208	0.3186
16	0.5270	0.9946	0.1116
17	0.9964	0.1338	0.0722
18	0.7907	1.4249	0.1979
19	1.4000	1.2436	0.1780
20	1.4000	4.9122	0.2112

F5

ITEM PARAMETERS FOR WRITING TEST

ITEM NUMBER	"A" ITEM DISCRIMINATION	"B" ITEM DIFFICULTY	"C" GUESSING PARAMETER
1	0.9678	-0.9819	0.1196
2	1.1138	-0.1070	0.1303
3	1.1213	-0.9913	0.1196
4	1.4461	0.1123	0.2851
5	1.3744	1.0233	0.2318
6	0.5903	-1.4046	0.1196
7	0.9751	-0.1766	0.3348
8	0.2351	-1.2373	0.1196
9	0.4867	-2.2913	0.1196
10	1.0349	-0.2917	0.1441
11	1.4248	-0.9238	0.1196
12	0.7331	0.7714	0.1097
13	1.5000	0.1792	0.1899
14	1.2371	-0.8386	0.1196
15	1.2441	-0.3693	0.1911
16	1.0856	-0.8846	0.1196
17	0.9234	-0.9609	0.1196

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